

FINANCIAL TIMES

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CHILE VOTE

Pinochet keeps all the trump cards

Page 16

Table with exchange rates for various countries including Austria, Belgium, Canada, etc.

Kabul calls for four-sided talks on UN accord

Afghanistan has written to the United Nations proposing a meeting between the US, the Soviet Union, Pakistan and Afghanistan to discuss the Geneva accords on Afghanistan, said Tass, the official Soviet news agency.

Six Japanese banks plan branches in Frankfurt

SIX MORE Japanese banks plan to set up investment banking subsidiaries in Frankfurt by early next year, undaunted by last October's stock market crash and the present torpor in the West German stock and bond markets.

UK faces demand for full statement on IRA deaths

By Michael Cassell in London and Our Belfast Correspondent

THE UK Government yesterday came under mounting pressure to disclose the full circumstances surrounding the shooting on Tuesday of three IRA men in Northern Ireland by security forces.

along the Omagh to Carrickmore road where their hijacked car was ambushed. The vehicle was riddled with bullets and the men died instantly.

British base. In a strongly worded statement, Mr Charles Haughey, Irish Prime Minister, and his Cabinet colleagues said "the frightening escalation in the level of violence undermines the very maintenance of the rule of law, and can only bring further divisions and tragedy for the people of the North."

come of the Omagh operation and accused him of interfering in British affairs. 'The Rev William McCrea, Democratic Unionist MP for Mid Ulster, said it was "sheer hypocrisy" for Mr Haughey to demand a report from the British Government.

In London, Mr Jim Marshall, an opposition Labour Party spokesman on Northern Ireland, wrote to Mr King asking that he should be asked to continue on Page 16

Airliners crash

At least 13 people were killed when a Delta Air Lines Boeing 727 with 104 passengers and crew on board crashed on take-off from Dallas-Fort Worth Airport, Texas.

Sudan slaps deaths

The UN World Food Programme said more than 100 people a day were dying of hunger in the town of rebel-besieged Sudanese town of Awel.

US ABBM warning

The US warned the Soviet Union that it would consider declaring a radar station in Siberia a "material breach" of the 1972 Anti-Ballistic Missile Treaty.

China accuses Vietnam

China accused Vietnam of disarming tens of thousands of its troops in Kampuchea and sending large amounts of arms to prop up the government it supports in Phnom Penh.

Hungary stoppage

Workers at a Budapest factory staged Hungary's third strike in a week when they stopped in protest at the sacking of their director.

Burma strike call

Burmese opposition groups called for nationwide general strikes and demonstrations again today, to add to the pressure on the one-party government for a return to democracy.

Mexican party's setback

Mexico's ruling Institutional Revolutionary Party (PRI) held a much reduced 20-vote majority when the 500-seat Congress was formed.

Greek smog ban

Greece banned half the taxis and privately owned cars from the Athens area to control a smog cloud that sent at least 75 people to hospital.

Kurdic flee

Eyewitnesses put the number of Iraqi Kurdish refugees crossing the border with Turkey to escape the Iraqi Army as high as 100,000.

Chico deaths

Three people were shot dead and more than 900 demonstrators arrested in protests against the military's choice of President Augusto Pinochet as sole candidate for a presidential plebiscite.

Ecuador economic plan

Ecuador's new Government announced an emergency plan as the first stage towards putting the economy in order and reducing inflation from 60 to 30 per cent.

Hungary's hard lottery

Hungary has begun selling its citizens lottery tickets for D-Marks, dollars and Austrian schillings to help service the nation's hard currency debt of nearly \$18bn.

Walesa urges strikers to end action after official talks

By Christopher Bobinski in Warsaw

MR LECH WALESA, leader of Poland's banned Solidarity trade union, last night urged an end to the strikes at the Gdansk shipyard and elsewhere following a three-hour meeting with Gen Czeslaw Kiszczak, the country's Interior Minister.



Lech Walesa: moderate line

Mr Walesa sent a telex message to strikers asking them to end their protest after returning from Warsaw to his home city of Gdansk. An aide said last night that Mr Walesa was conferring with strikers at the shipyard, and the strike there could end very soon.

Mr Walesa's moderate line has been to calm the situation in the country, although without offering official recognition of Solidarity. Rather, officials continue to declare they are ready to make far-reaching concessions on the political front and hope to incorporate opposition leaders into official institutions.

Union Texas loses appeal over taxing of dividends from UK

By A. H. Hermann and Richard Waters in London

BRITAIN'S Inland Revenue won an important tax case in the High Court yesterday when Union Texas International lost its appeal against tax deductions from dividends paid to it by its UK subsidiary.

Union Texas won its argument, but the court's interpretation of withholding tax was wrong and was awarded £1.3m. This has opened the door to similar claims totalling about £50m from US corporations in a similar position.

case could be forced to repay 0.2 per cent of all dividends which have been paid by UK subsidiaries to their US parents since 1982, amounting to an estimated £50m.

CARNIVAL CRUISE Lines of UK is to raise \$100m by seeking a listing for its shares on Tokyo Stock Exchange and making a public issue in the Japanese market.

BANK OF NOVA SCOTIA, Canada's fourth-largest chartered bank, reported earnings of C\$382m (US\$282m) or C\$2.02 a share for first nine months of fiscal 1988, up from C\$359.7m or C\$2.09 on an operating basis a year earlier.

SUN MICROSYSTEMS, the leading US computer workstation manufacturer, signed a long-term technology licensing and co-operative development pact with Texas Instruments, largest US semiconductor producer.

ANTOPAGASTA HOLDINGS, listed in London though most of its assets are in Chile, has acquired \$100m of cash ready for acquisitions, according to chairman Andronicus Luksic.

HONEYWELL, the US electronic controls and defence equipment group, is putting up for sale four divisions of its space and aviation systems business.

ALUSUISSE, the Swiss light metals and chemicals group, hopes to resume dividend payments this year after a three-year absence.

STEYR-Daimler-Puch AG, Austria's financially troubled machine and engineering group, has trimmed its loss for 1987 and aims to break even by 1990.

JACKSONS, Australia's first listed stockbroker, slipped into red for year to June.

MARKETS

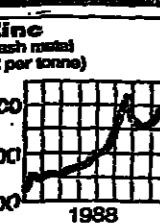
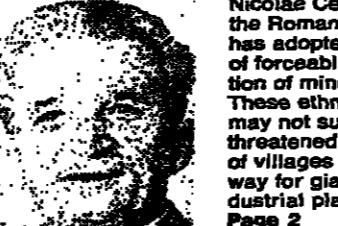


Table with Sterling, Dollar, and other market data

Table with Stock Indices for New York, London, and other markets

Romania's old and diverse cultures face annihilation

Nicolae Ceausescu, the Romanian leader, has adopted a policy of forcible assimilation of minorities.



Nicolae Ceausescu, the Romanian leader, has adopted a policy of forcible assimilation of minorities.

Managements How Tonka toys with its European range

Australia's Asian immigration issue divides

Editorial comments Pinochet stakes Chile's future; Lessons of the Karin B

Economic viewpoints: Unemployment is still today's problem

Kuwait and BP: Britain's free market credibility at risk

Lanz Maxwell; Peachey; Peart; BSR

Aerospace survey

Section III

Table with various market and news items

Advertisement for ANZ WorldWide bank, featuring text in multiple languages and a list of services.

EUROPEAN NEWS

Higher economic growth forecast in France

By Ian Davidson in Paris

THE PICK-UP in the French economy is showing much more staying power than expected...

industrial investment, which in the spring was forecast to grow by 6 per cent this year...

policy would be based on three principles: control of inflation, lower interest rates, and a restoration of the balance of payments.

Up to 100,000 Iraqi Kurds flee from fighting into Turkey

By Jim Bodgener in Ankara

EYEWITNESSES yesterday put the number of Iraqi Kurdish refugees streaming across the border with Turkey to escape the blitzkrieg of the Iraqi Fifth Army in northern Iraq as high as 100,000.

chemical weapons - have been tended by units of the Hakkari provincial government.

Denmark aims to hold down spending

By Hilary Barnes in Copenhagen

CUTS IN a variety of welfare payments, higher charges for medicine, user charges for libraries, and tapers from public records...

SPD bid to alter its anti-business image

By David Goodhart in Münster

WEST GERMANY'S opposition Social Democratic Party yesterday attempted to re-establish its lost credibility in economic management...

posals and drew the anger of union leaders by proposing weekend working and worker share ownership.

Netherlands plans big tax cuts

By Laura Raun in Amsterdam

THE DUTCH cabinet has agreed to cut steep taxes for both business and individuals as part of the 1989 government budget.

Hungary launches lottery to tap hard currency

By Leslie Collis in Berlin

HUNGARIAN HAS begun selling its citizens lottery tickets for D-Marks, dollars and Austrian schillings in an attempt to help service the nation's gross hard currency debt.

BBC attempts to push open the Soviet door

By Raymond Snoddy

MR JOHN TUSA, managing director of the BBC World Service, has appealed to the Soviet Union to take a stage further by increasing journalistic access to the country.

US presses Moscow on ABM treaty

By Andrew Gowers in Geneva

THE US yesterday sought to step up pressure on the Soviet Union over the 1972 Anti-Ballistic Missile Treaty by warning that it will consider declaring the Krasnoyarsk radar station in Siberia a "material breach" of the accord.

West Germany's tax scandal entangles insurance magnate

WEST German insurance magnate Mr Hans Gerling, 73, against whom an arrest warrant was issued earlier...

Haig Simonian reports on Hans Gerling, who has been ordered by a court to return from Switzerland to face tax evasion charges.

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Ceausescu's bulldozers ready to bury rich heritage

The old and diverse cultures of Romania's minorities are facing annihilation, writes Judy Dempsey

AGNES K left Transylvania in Romania four months ago with her two small children to settle in neighbouring Hungary.

Holocaust and emigration to Israel, the population has dwindled to fewer than 10,000.

Under such circumstances, the Bonn Government has decided to continue to "buy out" ethnic Germans, even though many officials hold the view that the Heimat or homeland of the ethnic Germans is Romania.

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Volograd tractors bogged down by old technology and poor quality

By John Lloyd in Moscow

THE Soviet Union's biggest, oldest and most honoured tractor plant is in a bad way.

planned that the vast plant was usually 4,000 workers short, forcing him to employ unskilled ex-convicts.

administration - as workers generally have been told to do by the national leadership.

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OVERSEAS NEWS

Afghan guerrillas quarrel over fate of besieged city

By Christina Lamb in Islamabad

UNCERTAINTIES among Afghan guerrillas after the death of President Zia ul-Haq of Pakistan, their staunchest ally, has provoked an all-out fight between resistance leaders over control of the southern city of Kandahar.

Mr Gulbuddin Hekmatyar, the fundamentalist leader, has gone there personally in an apparent attempt to sabotage negotiations between moderate resistance commanders and the Kabul regime aimed at ending the fighting.

Four posts around the city have recently fallen. Now only the airport and military posts in the town centre remain under regime control and the city which is under siege seems on the verge of falling. Any military attack would result in widespread casualties, civilians having refused to leave the town. Most mujahideen would prefer to win the city through political not military means.

Kandahar is traditionally a royalist stronghold. Fundamentalists fear that if the moderates gain control they may set up their own government and bring back the former King Zahir Shah. Moderate leaders claim that Mr Hekmatyar hopes to take the town, enabling the unpopular interim government, over which he has

almost total influence, to move in.

Mr Hekmatyar is unlikely to be able to secure a military victory in Kandahar. He has few men in south west Afghanistan and with Gen Zia's death has lost his most powerful backer. Mr Asim Nasser Zia of the moderate party NIFA described Mr Hekmatyar's move as a "suicide mission," while Mr Hamid Karzay of ANLS, another moderate party says with Zia's death Hekmatyar has become an orphan. He is a desperate man.

The Pakistan intelligence agency, ISI, which oversees arms distribution to the resistance, is believed to be backing Mr Hekmatyar in his attempt. ISI is already being blamed for "allowing foreign hands to penetrate Pakistan's inner-most security defences". An ISI official said: "We are as much in need of a victory in Kandahar as Zia was, and Hekmatyar is our man."

A Soviet spokesman yesterday acknowledged Moscow had sent military aircraft from Soviet territory to defend the Afghan town of Kunduz. Resister of the Civil Aviation Administration of China Genady Gerasimov said rebel forces had destroyed much of Kunduz and taken 200 women from the city before it was recaptured by Afghan troops.

Chinese get senior Hong Kong jobs

By John Elliott in Hong Kong

A NEW generation of high flying Chinese civil servants in their 40s has strengthened its hold on top jobs in Hong Kong's Government following a reshuffle of posts announced during the next few months.

Mr John Chan Cho-chak, 45, deputy chief secretary, who is a front runner to be the territory's first local financial secretary and chief secretary in a few years' time, has been announced as secretary for trade and industry. He succeeds Mr Hamish Macleod, 49, who becomes deputy financial secretary and is seen as a candidate to succeed Mr Piers Jacob when he retires as financial secretary next year.

Mr Chan's job, which involves handling Hong Kong's planned political reforms, is being taken over by Mr Michael Suen Ming-yung, 44, at present regional secretary for the New Territories. Two other secretaries' posts are being taken over by local civil servants.

Six Chinese crew members were killed yesterday morning when a Trident aircraft of the Civil Aviation Administration of China crashed in poor visibility into the harbour alongside Hong Kong's Kai Tak airport.

Asian immigration issue divides Australia

Chris Sherwell reports on a groundswell of opinion against cosmopolitan tolerance

LIKE A swelling boil, an infectious issue has resurfaced on Australia's body politic, disturbing the psyche of whole sectors of the country's 16m population. The issue is immigration: specifically Asian immigration. And it is sensitive enough to divide the country.

It has already opened a split within the opposition Liberal Party, which with its National Party coalition partner has made most of the running on the issue. A concerned Mr Bob Hawke, the Labor Prime Minister, has been up the post of Immigration Minister. Opinion polls show huge majorities in favour of slowing down Asian immigration, and the spectre of racism looms. Slogans such as "Asians out" can be seen on roadside rocks up the New South Wales coast. Talk-back radio shows confirm the sentiment. One well-known commentator's car was daubed with a swastika after he attacked the coalition view.

Among local Vietnamese, Chinese and Japanese there is deepening anxiety about the debate. Abroad Mr Lee Kuan Yew, Prime Minister of Singapore, has said it threatens Australia's standing in Asia.

Of course, immigration is not new as a political issue in Australia. A hundred years ago the New South Wales government tried to prevent the landing of Chinese immigrants.

The White Australia policy later became a commonplace. In the 35 years following the Second World War, millions of Europeans streamed in. Up to half came from the UK and Ireland, reinforcing the dominance of Anglo-Celtic peoples in Australia. For much of this period, other Europeans were the victims of prejudice.

Later, the proportion of Asian immigrants has increased markedly, to above 30 per cent of the annual influx. But overall the numbers remain tiny: on one calculation they will comprise less than 10 per cent of the population until far into the 21st century.

Over the past two decades, both sides of politics have adopted a bipartisan position on immigration and promoted "multiculturalism" - in effect, a tolerant, cosmopolitan Australia.

Yet in the space of a few months the Liberal and National parties have called it into question. "One Australia" is what they now stand for, and "social cohesion" - the trouble is, everybody is reading more into it.

That the subject surfaced as a public issue was perhaps inevitable. A specially-commissioned government inquiry on immigration headed by Mr Stephen Fitzgerald, former ambassador to China, published its findings in May, and it criticised existing policies.

It said current selection mechanisms would produce tens of thousands more immigrants than the planned programme, and that there was insufficient attention given to potential migrants' labour market skills and business talents.

More importantly, it warned that public support for immigration was threatened by widespread mistrust and failing consensus. The immigration programme was not identified in the public mind with the national interest, it said.

Such suggestions were like manna for the opposition. Having seen the Labor Government steal its economic policies, this was an issue which would distinguish the coalition from the Government and find broad support.

Before the report's publication, opposition figures began talking more about the issue, saying in particular that the "cultural compatibility" of migrants should be taken more into account. Mr John Howard, the Liberal leader, began advocating an increase in skilled and business migration.

Over subsequent weeks, Mr Howard began rejecting multiculturalism as aimless and divisive, saying it should be ditched. Having made immigration a political issue, he took it a critical stage further

earlier this month with a calculated comment about Asian immigration.

If the level of Asian immigration was too great "in the eyes of some in the community," he said, "it would be in our immediate term interests and supportive of social cohesion if it were slowed down a little so that the capacity of the community to absorb were greater."

The result was raging argument. Some pointed out that a greater emphasis on business and labour skills would actually entail more Asian immigrants. The opposition was accused of being racist and wanting a discriminatory immigration selection policy.

The real trouble came when two senior National Party leaders explicitly urged curbs on Asian immigration and suffered no reprimand. For those "small" Liberals content with two decades of bipartisanship with Labor, it was too much.

The coalition had not yet finalised its immigration platform, and they spoke out loudly. As the Liberal Party began tearing itself apart, the issue looked like backfiring, and Mr Howard banned further public statements.

Mr Howard held back in the hope that the issue might bring down Mr Howard, began exploiting the strains. Prime Minister Bob Hawke said any discriminatory policy would be "morally repugnant and economically insane".

The coalition finally confirmed its new position this week - different from Labor's, but a compromise the opposition can apparently live with.

Any government, it said, "must reserve the right from time to time to vary and alter policy, including adjustments to the size and composition of the immigration programme in response to changing requirements, be they social, economic, political or humanitarian". At the same time it declared that it would select people for immigration to Australia "regardless of race, religion or origin".

To test the opposition, Labor on Thursday put forward a motion in both houses of parliament calling for a commitment that "race or ethnic origin shall never explicitly or implicitly, be among" the criteria to determine the composition of the migrant intake.

Mr Howard let it go to a vote, and Labor pulled in a handsome haul of three Liberal MPs and one Senator who crossed the floor. Two others abstained. Today the Liberals and Nationals insist all is well, and are standing their ground. But Australia's politicians have a tiger by the tail. No one cares to predict where it will take them, or for that matter the country.

Press law outrages Indian opposition

By K.K. Sharma in New Delhi

THE Indian Government yesterday came under fire from opposition parties, constitutional experts and journalists for legislation rushed through parliament this week which is seen as an attempt to muzzle newspaper reporting on corruption.

The legislation seeks to jail and fine journalists who are guilty of an "aggravated form of defamation". Its critics claim it is intended to silence newspapers and deter them from publishing investigative reports.

Such reports have seriously embarrassed the Government for the past two years. They have been published by a number of national newspapers after painstaking investigation into allegations of payoffs and kickbacks in defence and other deals with foreign companies.

In particular reports have alleged there were payoffs in the \$1.4m contract for howitzers from Bofors of Sweden and in a deal for the purchase of German submarines and, most recently, payment of illegal commissions by Sumitomo of Japan in a pipeline deal with the government-owned Oil and Natural Gas Commission.

Mr Rajiv Gandhi's Govern-

ment is believed to have lost considerable support as a result of the allegations in the past two years. People close to the Prime Minister whose names have been included in the reports has been gravely embarrassed.

The defamation bill was rushed through the lower house of parliament late on Tuesday. Mr P. Chidambaram, Minister of State for Home Affairs, maintained that it was meant to preserve and promote truth. He also said it would raise the level of political debate in the country and curb vested interests who were using newspapers to make imputations.

Showing a rare unanimity, all the leading national newspapers yesterday published editorials attacking what the Times of India called a "Draconian bill". The Times particularly criticised the definition in the bill of any "imputation" about a person as defamatory if it is intended to harm the reputation of a person or if the publisher has reason to believe that it could cause harm. "Even worse, it puts the onus of proof that no defamation was caused upon the accused," the newspaper said.

UN chief seeks Iran-Iraq talks chairman

By Andrew Gowers in Geneva

MR Javier Perez de Cuellar, the United Nations Secretary-General, plans today to appoint a special representative to pursue his laborious mediation efforts between Iran and Iraq, which remained stalled for much of yesterday over an Iraqi demand for guarantees of freedom of navigation.

The increasingly frustrated Secretary-General was hoping to relaunch ministerial talks last night with a delicate compromise attempting to balance Iraq's concerns about navigation with Iran's desire for a withdrawal of Iraqi troops from its territory.

Mr Tariq Aziz, Iraqi Foreign Minister, is demanding that Iran abandon its right under international law to search Iraqi shipping in the Gulf while a formal state of belligerency continues. He also wants an assurance that Iran will not block clearance of the disputed Shatt al-Arab waterway.

Mr Perez de Cuellar would like to suspend negotiations and resume them in two or three weeks, presumably under the chairmanship of his special representative.

General strike called for across Burma

By Richard Gourley in Bangkok

BURMESE opposition groups have called for nationwide general strikes and big demonstrations again today, to add to the pressure on the one-party government for a return to democracy, diplomats in Rangoon said.

Broadcast vans moved freely through streets abandoned by the army and police announcing the action, while students and monks continued the marches through Rangoon that have helped bring the 26-year regime to the brink of collapse.

Armed soldiers loyal to Gen Ne Win, Burma's key military and socialist party leader, have tried to break a strike at the country's biggest oil refinery at Sittoung which has led to scarce fuel supplies.

The soldiers searched suburbs of Sittoung for engineers to restart the refinery but failed, diplomats said.

U Nu, who led the last civilian government until Gen Ne Win seized power in 1962, told Reuters he would announce today whether he would lead the opposition alliance that was formed on Monday.

S African churches' HQ bombed

By Jim Jones in Johannesburg

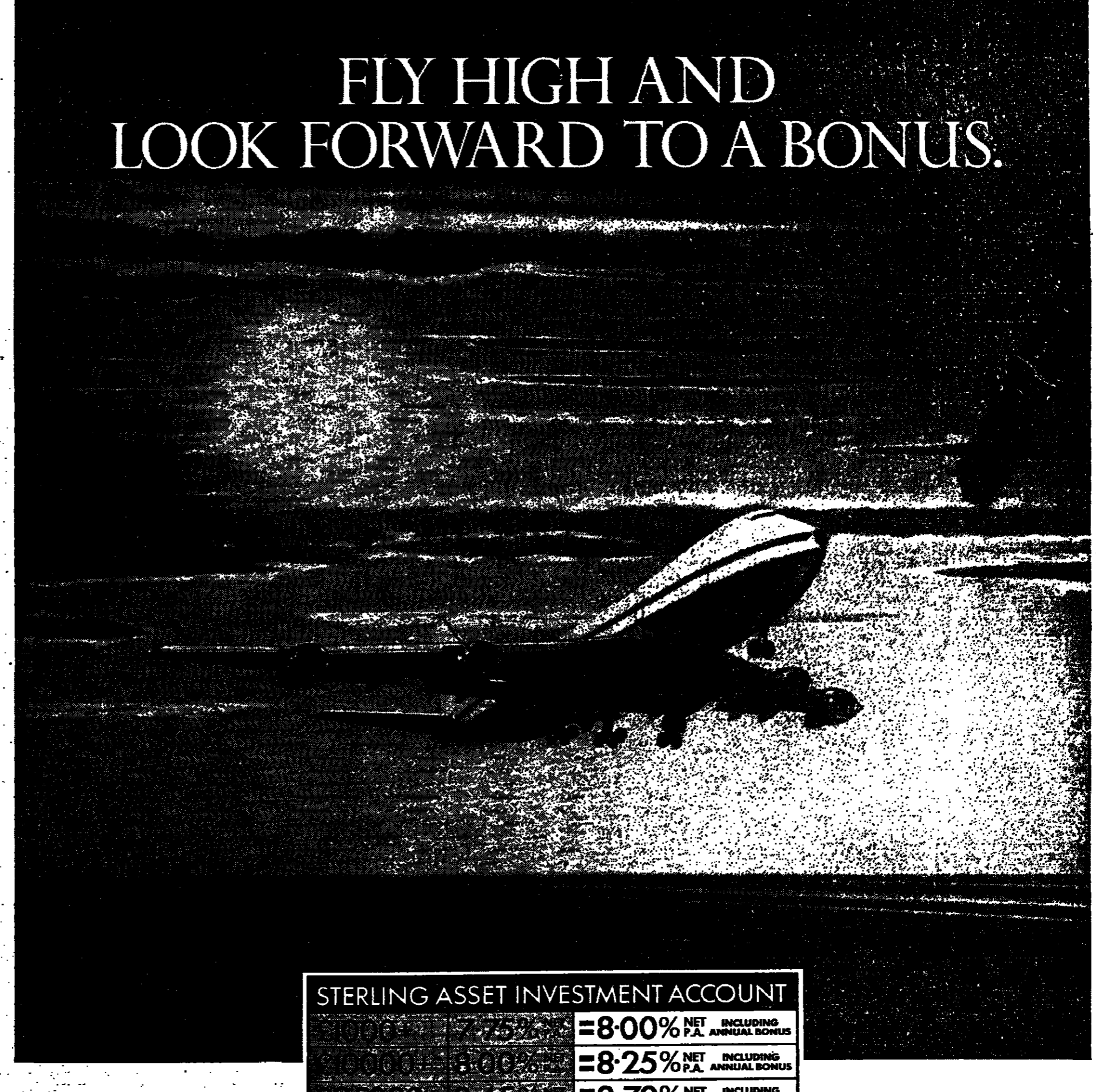
A BOMB explosion severely damaged Khosha House, the central Johannesburg building housing the offices of the South African Council of Churches and other leading anti-apartheid and human rights groups, in the early hours of yesterday. The blast injured 23 people in the densely populated, multi-racial city neighbourhood.

The police have said it is premature to speculate on links between the explosion and

another which destroyed the nearby office building of Cosatu (Congress of South African Trade Unions) over a year ago. A recent fire set by arsonists gutted the Johannesburg offices of the Transport and General Workers' Union.

The police have not yet apprehended those responsible for any of the earlier attacks. Mr Frank Mchunye, Cosatu's information officer, believes it unlikely the bombers would be brought to justice.

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<p style="font-size: 1.2em; margin: 0;">8.25% NET INCLUDING ANNUAL BONUS</p>	<p style="font-size: 1.2em; margin: 0;">= 8.25% NET INCLUDING ANNUAL BONUS</p>
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NATIONAL

AMERICAN NEWS

Ecuador aims to build up reserves

By Sarita Kendall in Quito
ECUADOR'S new government has announced an emergency plan as the first stage towards putting the economy in order and reducing inflation from 60 to 30 per cent.

Argentine politics takes on a visibly Byzantine air

Gary Mead describes the case of the Peronist and the Radical with nice things to say about each other

ARGENTINE political life is packed with rich intrigues but perhaps none quite so visibly Byzantine as the affection which Mr Carlos Menem, the Peronist presidential candidate, has discovered in himself for Mr Rodolfo Terragno, the Minister of Public Works.



Rodolfo Terragno (left) has won the support of opposition party candidate Carlos Menem



It might appear to signal a remarkable return to consensus politics in Argentina, considering that trade unionist supporters of Mr Menem accused themselves only two months ago by inventing a new national sport: who can hit Mr

Terragno with the most rotten vegetables and, in one incident, a second-hand toilet. Considering also that Mr Terragno's schemes to sell off large chunks of Argentine state-owned and financially broke industry is - or has

been - utterly loathed by the Peronists (whose hero, the late General Peron, set the whole state machine rolling in the first place), the whole affair becomes almost inexplicable. But not quite. The explanation lies in Scandinavia. Money speaks louder than party allegiance in Argentine politics, and these days there's an awful lot of money floating around the deals Mr Terragno is trying to clinch with regard to Argentina's national airline, Aerolineas, and its telephone system, Entel.

He claims to have sold 40 per cent of the former to Scandinavian Air Systems (SAS), for \$200m (though that figure is disputed by those close to the deal), and he hopes to persuade the Spanish telephone company Telefonica to help him out with Entel. Both Entel and Aerolineas badly need investment and professional management, but the Peronist position until now has been that Mr Terragno is simply interested in selling the country to nasty foreigners. Mr Menem's supporters in Congress have even accused Mr Terragno of shady deals in the two ventures.

PRI move renews election dispute

By David Gardner in Mexico City
A NEW electoral row has erupted between Mexico's ruling Institutional Revolutionary Party (PRI) and the opposition as both sides gathered in Congress for President Miguel de la Madrid's final state of the union address today.

GDP rise of 4% reinforces growth trend in Canada

By David Owen in Toronto

THE Canadian economy continues to grow at a rapid clip, with the country's inflation-adjusted gross domestic product rising at an annual rate of 4 per cent in the second quarter, according to Statistics Canada figures. This compares with a first quarter increase of 3.2 per cent.

remained relatively weak. Business investment in plant and equipment continued to grow rapidly, with business outlays advancing a full 4 per cent over the quarter and 20.6 per cent from a year ago. Import volumes rose by a substantial 4.4 per cent, accounting for more than half of overall demand growth.

due principally to a significant contraction in dividend receipts. In the capital account, non-residents continue to invest heavily in Canadian interest-bearing instruments. In the latest quarter, such investments totalled a net C\$7.5bn, of which C\$4.4bn was in bonds and the balance in money market instruments.

Argentina obtains pledge of \$750m loan from World Bank

By Gary Mead in Buenos Aires

A WORLD BANK delegation has left Argentina after spending almost three weeks in the country, with the promise, according to Argentine government officials, of a loan of \$750m.

At the same time a delegation from the International Monetary Fund is due to arrive this week to discuss Argentina's request for a new stand-by loan of \$1.2bn. Argentina's foreign debt currently stands at \$56bn, with repayments this year in the region of \$5bn.

economic plan launched by the Argentine government at the beginning of August. The measures were designed to halt a spiralling inflation rate of 25 per cent (in July) and tackle public sector spending which, officially, wastes at least \$2bn annually.

World Trade News

Holden's takes up fight with Ford for Australian market

By Chris Sherwell in Sydney

HOLDEN'S, long synonymous with car manufacture in Australia, launches a new large car today in a battle with Ford that will determine the company's future identity.

accumulated losses of A\$400m. At the end of 1986, an exasperated General Motors stumped up A\$700m to pay off the company's debts and split it into two. The successful engine company was lived off, and last year the car-making arm, Holden's Motor Company, announced a joint venture arrangement with Toyota of Japan.

Argentina in \$120m Iran arms sales

By Gary Mead in Buenos Aires

ARGENTINA is supplying Iran with a large quantity of arms. Mr Jorge Carnelli, head of Argentina's state-owned arms industry has confirmed that a 10-wagon train left Cordoba last week for shipment to Iran.

Yugoslav 'trade broker' bridles at red tape

Judy Dempsey in Ljubljana meets a fledgling entrepreneur

MILAN Lovrencic, a former banker in Ljubljana, jumped at the opportunity of setting up his own business when the Yugoslav republic of Slovenia lifted restrictions on private enterprise in January 1988.

devaluations of the dinar, Mr Lovrencic reckons he is losing a great deal. Furthermore, the Yugoslav dinar, once a fairly strong currency in the 1980s and early 1970s, is no longer able to buy, at reasonable prices, western technology, and especially information technology.

in Yugoslavia, the network of contacts and family connections are crucial components for seeking a trade deal. Above all, several Yugoslav businessmen resort to setting up "companies" in West Germany in order to retain their hard currency earnings.

But there are increasing signs, at least in Slovenia, that this may change. Mr Lovrencic, who has already a list of reputable companies which are looking into raising private capital for Rogaska Slatina, the internationally-famous spa in Slovenia.

The spa is owned by the state but is respected for its good management. Yet it needs substantial capital investment. And instead of looking to the banks, the management is considering the private investor.

USX wins steel products order from Soviet Union

By Nancy Dunne in Washington

USX is to sell 80,000 tonnes of tubular steel products to the Soviet Union, a deal believed to be the company's largest sale ever to the Soviets.

export about half the amount in the fourth quarter of this year and an equal amount in the first quarter of 1988.

Taiwan plans to cut more import tariffs

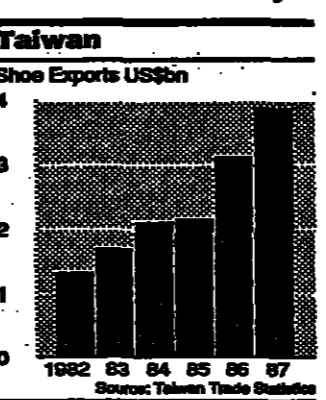
TAIWAN plans to reduce tariffs on about 300 imported products as part of its attempt to narrow its trade imbalance with the West, Reuters reports from Taipei.

Taiwan's shoemakers seek foothold abroad

Lower costs are leading the island's shoe industry to set up overseas, says Bob King

THE drive by Taiwan shoemakers over the past year to set up manufacturing operations in south-east Asia and China has been interpreted as the beginning of the end of the industry in Taiwan.

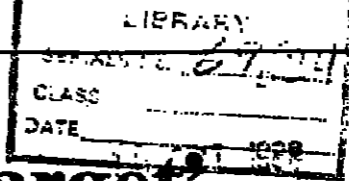
standards and to deliver on time. Thus, many buyers have been forced to return their orders to Taiwan, where quality and scheduling are more or less a constant, regardless of the higher price-points.



in Taiwan so that the workforce will be well-versed in techniques and standards. Pagoda International, another Taiwanese company, has taken a slightly different tack. Vice-president Lanny Chang says the company has over the past year made arrangements with 11 factories in Indonesia to produce jogging shoes exclusively for Pagoda, and expects to ship 1.5m pairs worth \$6.6m from that country this year.

"China connection" has grown over just the past year from shoemaking operations that involved "people who had business troubles here" to dozens of reputable companies which employ a variety of ploys to ensure their investments in China meet Taipei's demand that business with the mainland be conducted only indirectly.

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Leading export markets expand in wool textiles

By Alice Rawsthorn

DESPITE the strength of sterling, the British wool textile industry saw the value of its overseas sales rise by 3 per cent to £21.5m in the first half of the year.

The wool industry, which is still concentrated in the traditional wool towns of Yorkshire and the Scottish Borders, relies on exports for nearly half its sales. Last year wool textile exports increased by 7 per cent to £593m, according to the National Wool Textile Export Corporation.

Hong Kong group to buy half share of new hotel

By Paul Cheswright, Property Correspondent

HONG KONG and Shanghai Hotels, the Hong Kong-based group, is to spend \$55m for a half share in the new London luxury hotel to be developed from the former St George's Hospital at Hyde Park Corner in London's West End.

MPs' report urges timetable for spending to reach 0.7% of GNP Overseas aid 'should rise to UN target'

By Michael Cassell, Political Correspondent

BRITAIN should commit itself to a fixed timetable for achieving the levels of overseas aid recommended by the UN, says a report published yesterday by the House of Commons Foreign Affairs Committee.

Growth of retailers' credit business slows

By David Barchard

SUGGESTIONS THAT cheap credit from retailers may have been among the factors fueling the consumer boom over the past year were challenged yesterday when figures released by the Retail Credit Group showed that lending by its members slowed down slightly over the last financial year.

The RCG is an association of the biggest retail groups, including the Burton Group, Deans, Granada, Littlewoods, Marks and Spencer, Next, Rumbelows, and Storehouse, which issue credit to customers using their own plastic card accounts.

Building society repossessions fall

BUILDING societies took 9,180 properties into possession in the first six months of this year, 22 per cent less than in the corresponding period last year, the Building Societies Association said yesterday.

Tourist industries hit by sharp slump in N American visitors

By David Churchill, Leisure Industries Correspondent

BRITAIN'S tourism industries are having to face up to a sharp slump in the numbers of free-spending American tourists this summer.

Figures released yesterday by the Department of Employment show that some 6 per cent fewer visitors from North America came to the UK in June than in the same month last year.

Print union prepares for change with Japan trip

By John Gapper, Labour Staff

LEADERS of the general print union Sogat '88 are to visit Japan next month to study innovations in printing technology in an attempt to predict changes in working practices in the British printing industry.

Disruption to your Postal Service

Disruption to your Postal Service

The Royal Mail regrets the major disruption to postal services and the inconvenience to our customers because of industrial action by the Union of Communication Workers.

We are doing everything we can to restore a full postal service as soon as possible.

This unnecessary disruption is for the most astonishing of reasons - because we are paying MORE money to some of our new staff in London and the South East where we have a real problem attracting and holding on to new recruits. We need experienced people to protect the quality of service our customers expect and deserve.

The UCW opposes these payments and has refused our repeated appeals to return to the negotiating table - instead it called a 24-hour national strike.

We hope services will be back to normal shortly, but in the meantime if you need more up to date information on postal services in your area, please contact the Customer Care Unit shown in your local telephone directory under "Post Office."



COMPANY NOTICES

NOTICE TO HOLDERS OF WARRANTS
MITSUBISHI PAPER MILLS LIMITED
U.S.\$150,000,000 4 1/4 per cent. Notes Due 1993 with Warrants
Pursuant to Clauses 3 and 4 of the Instrument dated 27th April, 1988, the following notice shall be given.

Kleinwort Benson
Kleinwort Benson Limited announces that with effect from 1st September 1988, the mortgage base rate will be 12.4% per annum and the personal loan base rate will be 11.4% per annum.

LEGAL NOTICES
COMPANY NOTICES
REGISTERED OFFICE: 100, Broad Street, Birmingham B1 2LP
In accordance with the provisions of the Companies Act 1985, notice is hereby given that the accounts for the year ended 31st March 1988 have been prepared and are available for inspection at the registered office.

BANQUE NATIONALE DE PARIS
ECU 100,000,000 FIN DUE 1990
Notice is hereby given that for the interest period from August 31st, 1988 to November 30th, 1988 the notes will carry an interest rate of 7.25% per annum.

NOTICE TO BONDHOLDERS OF THE SANWA BANK, LIMITED
U.S.\$ 100,000,000 2 3/4 PER CENT CONVERTIBLE BONDS DUE 2000
Pursuant to Clauses 7, sub-clause (b) and (c) of the Trust Deed relating to the Bonds, notice is hereby given as follows:

Correction Notice BRISA
Auto Estradas de Portugal SA
Japanese Yen 10,000,000,000 Guaranteed Floating Rate Notes 1992
In the above Notice published on 20.7.88, the Paying Agent was KREDITBANK S.A., Luxembourg.

CITY OF LONDON PROPERTY
The Financial Times proposes to publish a Survey on the above on Friday 23rd September 1988
For a full editorial synopsis and advertisement details, please contact:

THE ENGLISH ELECTRIC COMPANY LIMITED
5 1/2% Debentures 1994/99
In accordance with the terms of the Trust Deed a drawing for redemption purposes of £250,000 of the above stock will take place on the 30th September, 1988.

JONATHAN WALLIS
on 01-248-8000 ext 4196 or write to him at: Bracken House, 10 Cannon Street London EC4P 4BY.

CLUBS
The following clubs are members of the Football Association: Arsenal, Aston Villa, Blackburn Rovers, Bolton Wanderers, Bristol City, Bristol Rovers, Burnley, Cardiff City, Charlton Athletic, Coventry City, Crystal Palace, Derby County, Everton, Fulham, Ipswich Town, Leeds United, Liverpool, Luton Town, Manchester City, Manchester United, Middlesbrough, Newcastle United, Norwich City, Notts County, Oxford United, Peterborough United, Queens Park Rangers, Reading, Southampton, Sheffield Wednesday, Tottenham Hotspur, Watford, West Ham United, Wimbledon, Wolverhampton Wanderers.

FINANCIAL TIMES
LONDON'S BUSINESS NEWSPAPER

UK NEWS

Joint venture to kick off US soccer drive

By Philip Coggan
WCRS, the UK-based advertising agency, has entered a joint venture to promote soccer in the US.

NatWest to seek listing in Tokyo

By David Lascelles, Banking Editor
NATIONAL Westminster Bank is to raise \$100m by seeking a listing for its shares on the Tokyo stock exchange.

Building societies 'have duty to tell all'

By David Barchard
BUILDING SOCIETIES planning to convert into public limited companies have received a fresh warning from the Building Societies Commission.

Postal union leaders consider further disruptive action

By Michael Smith and Kevin Brown
LEADERS OF THE UCW postal workers' union are to meet this afternoon to consider further industrial action after a 24-hour strike yesterday.



Postmen form a picket at a London sorting office

Postal union leaders consider further disruptive action

By Michael Smith and Kevin Brown
LEADERS OF THE UCW postal workers' union are to meet this afternoon to consider further industrial action after a 24-hour strike yesterday.

Ports face industrial dispute

By Jimmy Burns, Labour Staff
BRITAIN'S ports could face industrial disruption next month because of a dispute over annual holiday entitlements.

Tests in £1.5bn job training initiative see 55% failure rate

By Charles Leadbeater, Labour Correspondent
MORE than half of the trainees who entered development projects set up to test the Government's £1.5bn Employment Training programme, left before they started training.

Advertisement for 'WILL POWER' featuring a portrait of a man and text: 'Please use your WILL POWER to help us grow old with dignity'.

Airport capacity to be political issue 'by end of this century'

By Lynton McLain
A DECISION on increasing airport capacity will be on the political agenda by the end of the century as attempts are made to meet growing demand for air transport.

Information services set for growth

By Terry Dodsworth
THE UK market in information services carried over the telephone network is likely to grow by between 30 per cent and 35 per cent a year until the early 1990s.

UK ECONOMIC INDICATORS

Table of UK Economic Indicators including GDP, Industrial Production, Retail Sales, and Unemployment for 1987 and 1988.

Advertisement for FT Commercial Aviation Conference, featuring the FT logo and text about the event.

Advertisement for National Australia Bank, highlighting its services and international presence.

Rental 'glut' in London

By Ralph Atkins, Economics Staff
THE SUPPLY of homes available for rent in London has grown faster than demand in the past three years, says a survey published today.

Table titled 'GRANVILLE SPONSORED SECURITIES' listing various stocks with columns for High/Low, Company, Price, Change, Dividend, and Yield.

Advertisement for National Australia Bank, including contact information and branch details.

Table of Financial Indicators including Money Supply, M1, M2, and M3, and Annual Percentage Change for 1987 and 1988.

Advertisement for '12 FREE Issues' from the Financial Times, offering a subscription to the magazine.

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FOR ACCOUNTANTS

INTERNATIONAL APPOINTMENTS

Allied-Signal announces appointment of treasurer

ALLIED-SIGNAL, the US-based worldwide advanced technology group with businesses in aerospace, automotive products and engineering materials, has elected Mr G. Peter D'Alola vice-president and treasurer, and Mr Nicholas A. Cameron to the newly-created post of senior vice-president, operations services. Both appointments became effective from August 1.

Mr D'Alola, 43, and formerly vice-president, taxes, has succeeded Mr William F. Loftus, who has left the company to pursue other career opportunities.

In his new position, Mr D'Alola has assumed responsibility for the corporation's domestic and international finance and banking functions.

Mr Cameron, 49, took up employment with the company in 1960 and has held a variety of executive positions in finance, strategic planning and administration.

Since 1986 Mr Cameron has served as a senior vice-president and group officer. He is now directing through the new post several corporate service groups, including health, safety and environmental sciences, administrative services and information systems and services.

Mr Cameron will also be responsible for special projects as assigned by Mr Alan Belzer, president and chief operating officer.

Digitext chooses chairman

DIGITEXT, a California-based computer company, has appointed Mr Philip C. Haines chairman and chief executive.

As chairman, Mr Haines replaces Mr Monty D. Kaufman, who will continue as a director of the company. The post of chief executive, has been vacant since October 1987 although Mr Haines has served for several months as acting chief executive.

Mr Haines was the founder and is chairman and chief executive of Kmark Corporation, the producer of word processing equipment and multi-user office automation computers. He will continue to serve as chairman and chief executive of Kmark, but will devote his main efforts to Digitext.

Mr Haines was elected chairman of the board of directors at AMAX, US-based natural resources group. He is chairman and chief executive officer of Bowater Inc, the largest US manufacturer of newsprint.

Mr Gammie was elected chairman of Bowater in 1985. He has been president and chief executive officer since the company was listed on the New York Stock Exchange in 1984.

Finnish commercial bank strengthens management team

By Olli Virtanen in Helsinki

KANSALLIS-Osake-Pankki, the Finnish commercial bank, has appointed two members to its board of management as of September 1, 1988.

Mr Pentti Rissanen, 45, will be senior vice-president responsible for group audit, legal affairs, contacts with the regulatory authorities and monitoring international legal developments.

Rissanen, who is currently senior vice-president in KOP's Investment Banking organisation, will largely assume the position of Mr Simo Käräva, who retired in July.

KOP also appointed Mr Peter Fagerås, 36, as senior vice-president responsible for investment banking. He replaces Mr Jukka Härmälä, who left the bank to become managing director of the Finnish forest industry group, Enso-Gutzeit. Fagerås is presently managing director of Kansallisbanken, KOP's Stockholm subsidiary, which will be wound down following the deal in which KOP bought a substantial share of Gota, the Swedish banking group earlier this year.

Enso-Gutzeit, the Finnish state-controlled forest products company, is restructuring its top management.

From the beginning of next month, Mr Jukka Härmälä, 41, will become managing director and chief operating officer.

Mr Pentti Salmi, current managing director, will be chairman of the board and remain chief executive, concentrating on corporate strategy.

Mr Härmälä is current executive vice-president for investment banking and a member of the board of directors at Kansallis-Osake-Pankki, Finland's leading commercial bank.

Mining group names president

By Our Montreal Correspondent

MRS HELEN ROMAN-Barber, who took over as chairman of the Roman Mines Limited, the resource group, after the death of her father, Mr Stephen Roman, early this year, has appointed a financial manager as president of the family holding company.

Mr Montrose Emerson, 56, chief financial officer of Procter & Gamble Canada, has spent 32 years in the consumer products industry.

He will become president of Roman Corporation, the Roman family company that controls 37 per cent of Denison Mines, the uranium, potash and oil and gas group.

Roman Corporation also owns 26 per cent of Lawson Hurdon Group, the international packaging company, 100 per cent of a paper products group, and interests in financial services.

Earlier this month Mr Charles Farnelle, a 20-year-old associate of Stephen Roman, resigned suddenly from the presidency of Roman Corp and as vice-president of Denison Mines, because of policy differences with Mrs Roman-Barber.

Mr Emerson has not worked previously in the mining sector and he said his first task will be to "get in and understand the business and review it with the chairman."

ACCOUNTANCY APPOINTMENTS

Sun Microsystems is rapidly emerging as one of the major forces in the computer industry. Established in 1982, we are already a \$1 billion worldwide supplier of advanced UNIX based "workstation" technology and have doubled our turnover in the past 12 months. In the UK alone, we have business valued at \$80 million, which is expected to increase dramatically as we establish ourselves in further key markets.

We now require a suitably qualified Financial professional to assume responsibility for the direction and development of accounting and administrative operations within the UK and Sweden. The department is currently 40 strong and organised under 6 managers, all of whom will report to you. Functions include Accounting, Financial Planning & Control, Distribution, Legal and Real Estate.

This will be a highly challenging role, reporting directly to the UK Managing Director. It will demand drive, adaptability and first class professional skills, and ideally a recognised accountancy qualification. You should also have at least 10 years' experience, preferably gained within a hi-tech sales & marketing environment.

An accomplished communicator with the ability to take an active part in customer negotiations, you will have excellent man-management skills, presence and the capacity to develop with a business which is rapidly expanding.

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For a confidential initial discussion please telephone John Hall on (0276) 62111. Alternatively send full career details to him at Sun Microsystems UK Ltd, 31-41 Fernhedge-Broadway, Camberley, Surrey GU21 1YB.

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The emphasis of the position is on the provision of effective management information to senior business managers, particularly within the context of our overseas subsidiaries. This will involve you in the critical review and analysis of activity within the division, making recommendations and proposals to improve performance and profitability.

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- Tax Planning
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- Statutory Reporting
- Ad hoc acquisition investigations

This is a significant position leading to appointment as Finance Director of the PLC based on ability and performance.

Applications are invited from graduate ACA's with a 'Big 8' training and subsequent track record of success in a growth orientated commercial/industrial environment. You will have the presence and communication skills to liaise at senior levels, both internally and externally, and the ability to manage the finance team. An energetic and ambitious style will need to be supplemented by a resilient and determined attitude.

The remuneration package is negotiable and includes a basic salary of up to £40,000, executive car, profit related bonus of up to 20% and a subsidised mortgage after a qualifying period.

In the first instance, please write in confidence enclosing a full curriculum vitae, quoting reference 404/1, to Jonathan Williams, Charles Barker Selection, 30 Farringdon Street, London EC4A 4EA.

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Best growing, commercial service company, with turnover in excess of £50 million, seeks to recruit a qualified Accountant for their Head Office in Central London. Controlling a team of 30 staff and reporting to the Finance Director, responsibilities will embrace all areas of finance, including management and financial reports; budgeting, forecasting, analysis, industry trends and systems development. Candidates should be aged 29-35, with a 'hands-on' approach and a forceful but tactful character. Systems and staff management experience are essential.

Please apply directly to Richard Holland at Robert Half, Prospect, Water House, Bedford Street, 41B The Strand, London WC2R 0BR. Telephone 01-830 3545, evenings 01-348 1773.

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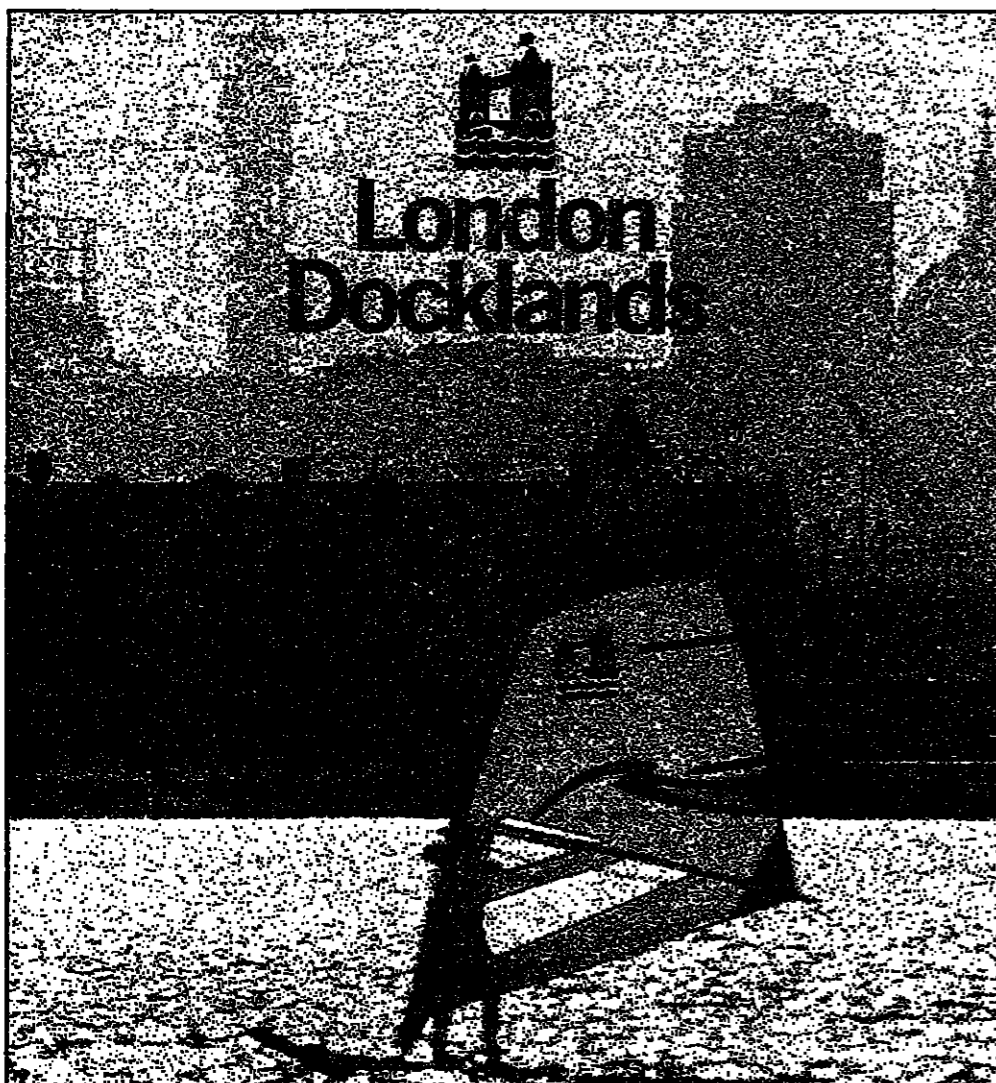
Robert Walters Associates is rapidly emerging as the most progressive financial recruitment consultancy in London and the South East. In order to assist us in our next expansion phase, we are looking to recruit a Financial Controller who can demonstrate thorough accounting ability together with a strong sense of commercial awareness.

The successful applicant will have experience of fully computerised accounting systems, tight reporting deadlines and financial planning using Lotus or equivalent. This will preferably have been gained within a large corporate environment.

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The organisation is energetic and values flexibility. Candidates will require the interpersonal skills that will enable them to work effectively with a number of articulate professionals and the ability to present material to the most senior levels of the organisation.

Candidates should be qualified accountants with up to four years post qualification experience in the public or private sector.

Candidates should write for an application form to: Mr. Chris Woodman, Personnel Officer, London Docklands Development Corporation, Unit A, Great Eastern Enterprise, Millharbour, London E14 9TJ.

We intend to start reviewing applications on Monday, 19th September, 1988. An Equal Opportunity Employer.

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GROUP COMPANY SECRETARY

A leading South East PLC, established as a market leader in the expanding residential development market, with estimated turnover for 1988 in excess £100m, has an opportunity for a young, dynamic Group Company Secretary to join their senior management team.

Reporting to the Director of Finance you will provide a full secretarial service to our Group of Companies and will provide a specialist accounting service to a new subsidiary Company. The successful candidate will be a Chartered Secretary or an Accountant with knowledge of secretarial practice, company law and stocks exchange procedures. In addition he/she will be in their early thirties with a dynamic approach to business, excellent communication skills, flexibility and commercial awareness.

We offer an excellent salary and a benefits package comprised of company car, private health care, pension scheme etc.

To apply send full CV to Box A0982, Financial Times, 10 Cannon Street, London EC4A 3DF

Schlumberger Industries

MANAGEMENT ACCOUNTANT

C. £15K
NORTH WEST BASE

"Keeping us in the Pink"

Schlumberger's success story continues throughout the global group and that includes the Measurement Division of Schlumberger Industries which has made a significant contribution so far.

Based in Oldham, our range of measuring equipment for the water, gas, chemical and process industries is pioneering and profitable. Nevertheless, our accountants make sure we keep things in perspective which is where you come in.

Working towards full ICMA qualification you'll have had around 5 years' background experience within a Finance Department, including 3 years' at supervisory level. Here, you'll put that practice into good use, controlling staff and working on product costing, analyses of balance sheets and material/labour variances as well as producing monthly and quarterly financial packs.

It's a rewarding role for a logical and industrious individual with a good knowledge of Lotus 123. To apply, send your CV quoting current salary to: Schlumberger Industries Measurement Division, Salmon Fields, Royton, Oldham, Lancashire, quoting ref. JC/201.

Handwritten note: *لدينا من الاجل*

Finance Director

Design & Communications Group £35,000 package + Car London

Our client is one of the world's leading international design and marketing consultancies with an outstanding reputation for both its creativity and the commercial impact of its work. Over the last few years this public company has achieved a dramatic increase in the range and scale of its activities, towards an expected group turnover of £40m. The organisation has an excellent blue chip client base and with recent acquisitions in America and the opening of new offices in Europe the expansion achieved to date is expected to continue.

Reporting to the Managing Director of this £7m turnover business, the successful candidate will have a strong commercial bias, playing an active part in the future planning and strategy of this high profile company. They will need a strong personality in not only dealing with the marketing and creative teams but also

strengthening the current tight financial controls and disciplines in the business.

Candidates will ideally be qualified accountants, in their 30's who have direct hands on commercial experience within a service industry environment.

Please telephone or write enclosing full curriculum vitae quoting ref: 228 to:
Philip Cartwright, FCMA,
97 Jeremy Street,
London SW1Y 6JE
Tel: 01-839 4572

**Cartwright
Hopkins**

FINANCIAL SELECTION AND SEARCH

Impressive organic growth together with an aggressive International acquisition strategy continues to enhance this Company's reputation as a European market leader in computer services.

Finalist ACA/CACA/CIMA c.£17,500 + Benefits ACA Based Amsterdam then UK

As a result of our client's growth in Europe, there is an immediate requirement for an ambitious part-qualified accountant to assume the role of Financial Accountant for two operating companies within the Group.

Based in SW London you will have sole responsibility for the preparation of monthly management reports, including budget analysis, forecast presentation and statutory accounts. Strong communication skills are essential as liaison with field controllers is frequent.

This is a demanding role necessitating a high level of technical ability; in return career progression will be excellent and study assistance provided.

Contact: Susan Wild.

The financial accounting function in many companies is often considered to be one of the less exciting areas in which to operate. In our client's current expansion mode this couldn't be further from the truth as the role takes on a new dimension involving wide exposure to issues such as European Taxation, post acquisition reviews and ad-hoc assignments in a variety of locations throughout Europe.

Based initially in Amsterdam with generous living allowances, you will then return to the UK after a period of six months to take a significant role in the centralisation of the European reporting function. Some language skills would be an advantage.

Contact: Stephanie Warren.

For further information contact the consultants named above on 01-437-0464 or write enclosing brief details to the address below. If you are currently working in Europe and would prefer an initial meeting in our Brussels office contact Simon Malloni on (322) 512 6642.

ROBERT • WALTERS • ASSOCIATES

RECRUITMENT CONSULTANTS
Queens House 1 Leicester Place Leicester Square London WC2H 7BP
Telephone: 01-437 0464

Christie-Tyler

FINANCE DIRECTOR (Designate)

SOUTH WALES
Package circa £30,000 plus car

Christie-Tyler PLC, the leading furniture manufacturer in the United Kingdom and a member of the Hilldown Holdings Group, has a vacancy for a Finance Director at one of its subsidiary companies. The company, which is based near Bridgend, is a fully autonomous manufacturer in the competitive area of upholstered furniture and has a turnover of £14 million.

The successful candidate, a qualified accountant preferably aged between 27 and 45 years, will have either been the senior financial manager in a smaller company or will have managed specialist financial areas in a larger business and now wishes to be responsible for the complete financial management of a company.

Candidates must have sound commercial awareness and be prepared to take an active role in the general management and development of the company.

The package includes a bonus based on results together with benefits which include a car, pension, free life assurance and BUPA.

Please apply with full career and personal details to:
P.N.T. Whiting, FCA.,
Finance Director,
Christie-Tyler PLC,
Brynmynn, Bridgend,
Mid Glamorgan, CF82 9LN.

Finance director

Leeds c£25,000 + equity share + car



A chance to play a major role in the development of a business in which you will hold a stake. This long established and successful chemical company was previously part of a large group; ownership has changed with a view to going to the market in 4-5 years time. The new position of Finance Director has been created to further strengthen the Company's senior management team.

Responsible for the entire finance function you will be closely involved in the planning and control of the future growth of the business. You will manage a small financial department which handles all accounting, performance monitoring and planning. Your priority will be to improve the accuracy and timeliness of management information through the introduction of a computerised accounting system. You will also have the role of Company Secretary.

Qualified and preferably a graduate, you should be in your early 30's and be able to demonstrate at least five years successful management accounting experience working in industry. You may well be looking for your first opportunity to take full control of the finance function.

Please write enclosing your curriculum vitae and daytime telephone number to
Tony Potter Reference 1837P.

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Albion Court 5 Albion Place
Leeds LS1 6JP

Major International Bank

New Executive Appointments In Financial Control And Business Planning

c £32,000, Car, Full Banking Benefits City

Reporting to the Director of Finance, UK, himself a new appointment, these two new key positions are vital elements of a far-reaching and dynamic plan to reinforce the position of this major international Bank as a leader in UK Banking.

Financial Controller

You will impact the rapid and successful growth of UK Retail Banking by driving forward appropriate financial systems and controls and making creative input to strategic planning, budgetary and investment processes. You will probably be a blue chip trained Chartered Accountant already with relevant experience and success at senior level in a progressive commercial environment. Ref: C13051/FT.

Business Planning Manager

You will impact the total development of the Bank's UK activity through the establishment of a top level, disciplined, proactive planning function. You will ensure the practical progression of a rolling 3 year business strategy by thorough evaluation of projects, new products, forecasts and competitor and general business trends. With a good degree (perhaps MBA) you will be an incisive and lateral thinker. Business orientated, you will have relevant experience in banking or in a commercial environment perhaps as a business analyst or project accountant. Ref: C13052/FT.

Both positions offer real career potential. Male or female candidates should submit in confidence a comprehensive c.v. or telephone for a Personal History Form to:
A.J. Pegg, Hoggett Bowers plc,
Pearl Assurance House, Greyfriars Road,
CARDIFF, CF1 1HZ, 0222-397246,
quoting the appropriate reference.

Hoggett Bowers

Executive Search and Selection Consultants
MEMBERSHIP: BRISTOL, LONDON, LONDON, LEEDS, MANCHESTER, NEWCASTLE, NOTTINGHAM, SHEFFIELD, WINDSOR
A MEMBER OF BLUE ARROW PLC

Financial Controller/ Company Secretary

c£19,000 + Car + Benefits Avon

As part of a privately owned group of companies, our client is engaged in the project management and supply of equipment to process industries worldwide. Projected turnover is likely to exceed £3 million in the current financial year.

A challenging opportunity has arisen for a Financial Controller/Company Secretary. Reporting to the Group Chairman, you will be responsible for all financial/secretarial functions, preparing monthly reports, detailed cash forecasts and operating a stringent accounting check on costs against budgets. You will assess new ventures and negotiate contracts which will involve close liaison with Lawyers and Merchant Bankers. Additionally, involvement with recruitment and personnel matters will be necessary.

Aged not less than 30, you will be a fully qualified Accountant or Company Secretary with several years' experience gained in an industrial/commercial environment. Computer literacy and familiarity with spreadsheets is essential. Experience of export documentation and personnel systems would be advantageous but by no means a prerequisite.

In addition to the salary quoted above, benefits include fully expensed 2 litre car, pension, life assurance and medical schemes and generous relocation expenses to this attractive part of the West Country.

Please write with a full career history to Michael Socha, PER, Minister House, 27-29 Baldwin Street, Bristol BS1 1LY.

PER Management Selection

FINANCIAL CONTROLLER

MANCHESTER c£18-20,000 + Car

Our client is a rapidly expanding quoted Company engaged in the fast moving retailing/distribution sector. Current group turnover is c£30m with an enviable growth and profit record achieved via a series of successful acquisitions and organic growth.

With exciting plans in hand including further acquisitions, they now seek to recruit a young Qualified Accountant to report to and work closely with the Group Financial Director and take full responsibility for the day to day running of the accounts function producing consolidated monthly management information for the Group. Initially, emphasis will be placed on the further development of computerised accounting and reporting systems.

To be considered for this demanding and high profile position, candidates should be able to demonstrate a successful track record in date together with the interpersonal skills necessary to establish credibility amongst the Senior Management team. Excellent prospects for career progression exist.

To apply in the first instance contact Jane Leeds on 061-226 1212 or 04574-6830 (Evenings).

STARK BROOKS

ASSOCIATES LTD

Accountancy Recruitment Consultants
SUITE 67/479 ST. JAMES'S BUILDINGS
OXFORD STREET MANCHESTER M1 6PL
TEL: 061-226 1212/061-226 018.

STATE OF QATAR

Ministry Of Finance & Petroleum
& Petroleum
Department of Civil Servants Affairs

ANNOUNCEMENT

The Ministry of Finance & Petroleum announces vacancies for Translators specialised in translating legal texts from Arabic to English & vice versa

Applicants should have a University degree, with at least ten years experience in the same field.

Those who have worked with International Organisations and International Companies will be preferred.

Salary will be determined according to qualifications and experience.

Applications should be addressed to:
THE CIVIL SERVICE
DEPARTMENT
Ministry of Finance & Petroleum
P.O. Box 36, Doha, QATAR.

Deadline for applications will be on 30th September 1988

EUROPEAN FINANCE AND ADMINISTRATION DIRECTOR

SURREY c£35,000 + Car

Our client, a Group H.Q. Company which is profitable and has a turnover c£100 million, conducts its business through subsidiaries based in the U.K., in major Western European centres, and through Associates or Agents in Eastern Europe, the Middle East and in Africa. It is an important subsidiary of a large U.K. public group operating internationally. Group companies provide highly specialised facilities and systems to industrial, commercial and government markets, taking projects from concept through design, selection and purchase of equipment, installation, commissioning and on-going regular maintenance.

The Group operates in a high growth industry and its development will be reinforced by a programme of acquisitions in Europe, now well in hand. Also because of technological change and other factors it is probable that markets will widen and grow at an accelerating rate.

The Finance & Administration Director answers to the Group Managing Director and will:

- be a qualified accountant, aged between 30-50, ideally 35-45.
- hold a senior financial management position carrying responsibility for the financial control of a group of companies, and have some experience of acquisitions preferably in Europe.
- have experience, financial or commercial, of doing business overseas preferably gained in a technically-based service industry or in a contractor's organisation, or possibly in electronic or in electrical engineering.
- be prepared for a reasonable amount of travel in Europe.

Whilst the position is U.K. based the appointee need not be a U.K. national. Pension, health and security benefits are commensurate with the seniority of the appointee; assistance with re-location costs will be provided if necessary.

Write briefly or send CV to John Hearn at this address:
Hearn Healy & Partners
Management & Recruitment Consultants
Westmorland House, 127 Regent Street, London W1R 7HA
Tel: 01-734 6267

FINANCIAL DIRECTOR (DESIGNATE)

CENTRAL LONDON neg. to £25,000 + CAR

To produce meaningful management information, the £4m. turnover service industry subsidiary of a USM co. heading for a full listing, requires a very able young qualified ACA/CIMA or equivalent to reorganise its accounting systems.

The successful candidate is likely to be in the 25-35 age range with a minimum of 12-18 months commercial experience.

He or she should have a sense of humour and a high degree of inter-personal skills in order to relate to a young and vibrant management team. Clearly a capacity for hard work and the relevant accounting skills are also absolutely necessary.

Contact:
GEORGE D MAXWELL
Managing Director
International Business Centre
1-3 Mortimer Street
London W1N 7RH
Telephone: 01 580 7739/7695

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For your invitation or for further information contact:
Accountancy Personnel,
Equity & Law House,
33-38 Gray Street,
Newcastle NE1 6EE.
Tel: 081 232 4111

**5pm-8pm
WEDNESDAY 21st SEPTEMBER 1988**

**AT
THE NEWCASTLE CIVIC CENTRE**

Victoria House,
159-163 Albert Road,
Middlesbrough TS1 2PX
Tel: 0642 226716

SENIOR MANAGER

Glasgow c£30,000 Package

For the right candidate this role will lead to partnership in this long established but rapidly developing practice.

As one of the largest firms in the West of Scotland it now forms the northern link in the national association of Stoy Hayward and Horwath & Horwath & Horwath.

The firm is committed to providing a range of business and financial services at the highest level to a large portfolio of personal, private companies and "PLC" clients in a wide range of industrial sectors and activities.

The firm seeks a Chartered Accountant at senior manager level to initially work with the firm's Managing Partner on some of the most interesting and challenging client assignments. Drive, ambition, commercial flair and the highest standard of professional care are prerequisites essential for this position.

The financial package includes a car, health scheme, pension and relocation expenses.



For further details contact:
Accountancy Personnel
93 Hope Street,
Glasgow G2 8LD
Tel: 041 204 0944

FINANCIAL DIRECTOR

Glasgow to £30,000+Jaguar XJ6

A unique opening exists for a dynamic self starter to join a rapidly expanding financial services group. This is a once in a lifetime opportunity to join a cash rich company in its early stages of inception which already has its sights firmly set on a full listing.

The company now seeks a young commercially aware individual capable of heading the accounting function whilst providing sound financial advice to the board ensuring continued business expansion.

In an environment where the "work hard play hard" ethic prevails, your commitment will be rewarded with the opportunity for future equity participation.

CONFIDENTIAL

For further details contact:
Accountancy Personnel
93 Hope Street,
Glasgow G2 8LD
Tel: 041 204 0944

EUROLYNX FINANCIAL CONTROLLER

Bromley, Kent c£27,000+Car

EUROLYNX (UK) Ltd is a highly successful, Australian public company involved in international commodity trading, food processing, merchant banking and financing, fund management and property development.

They are seeking a highly motivated qualified accountant (preferably ACA), in their mid-late 20's with at least two years post-qualifying experience to assume total responsibility for the finance function of a £20 million turnover subsidiary involved in Food trading.

An attractive remuneration package is offered, together with superb opportunities for career advancement in this progressive and rapidly expanding organisation.

For further details contact:
Accountancy Personnel
19/23 Masons Hill,
Bromley, Kent BR2 9HD.
Tel: 01-454 8848

CONFIDENTIAL FINANCIAL CONTROLLER

London £27,000+Neg+Car

Our client is the recognised market leader in the field of business records management and storage services, whose renowned parent group is soon to see the company continue its impressive record of success, in order to prepare the division for further growth the existing Finance Director is to be promoted to a new position of Chief Financial Officer. A qualified Accountant is required to take on the role of Financial Controller and to assume total responsibility for the finance function of a £20 million turnover subsidiary involved in Food trading.

You will be a Qualified Accountant in your thirties with a proven track record in a commercial environment. In addition to a highly competitive salary package, prospects within this diverse group are excellent.

For further information in complete confidence please call quoting Ref: JCCL.

For further details contact:
Accountancy Personnel
6-8 Glen House,
Stag Place,
Victoria SW1E 5AG.
Tel: 01-826 7555.

B Elliott plc FINANCIAL ACCOUNTANT

NW London c£22,500+Car

An interesting and challenging opportunity requiring excellent accounting and communication skills is offered by B Elliott plc - a revitalised and rapidly expanding international engineering products group, turnover in excess of £70m.

Reporting to the Group Financial Controller the responsibilities include:
• Development of new Group Financial Information systems including improved presentation of key financial information.
• Consolidation of Group monthly results and annual financial accounts and budgets.
• Assisting with treasury operations and tax computations.
Ideally you should be fully qualified (ACA/ACCA or CIMA) and have experience of using IBC's.

The expansion of the Group will ensure a continuing challenge in this role and offers opportunities for career development.

For further details contact:
Accountancy Personnel
30/31 The Broadway,
Ealing W5 2NR
Tel: 01-579 6585

CONFIDENTIAL MANAGEMENT SERVICES MANAGER

Surrey c£30,000+Package

Grant's Employment and related Services has been spectacular in the past 3 years. In order to fuel further progress the Substantial Division of a large private conglomerate wishes to recruit an experienced line manager to act as an interface between the operational and administrative functions. Your responsibilities will include all computer operations, the development and design of new systems and the control of an internal training and computer support department.

Reporting to the Group Finance Director you will be in your 30's, have an accounting qualification and have extensive Computer Management experience. As well as superb prospects within such a progressive Company a highly attractive salary and benefits package on offer. Reference: SMC.

For further details contact:
Accountancy Personnel
70 Watling Street,
London EC4M 4DD.
Tel: 01-236 4428

SOUTHAMPTON INSTITUTE OF HIGHER EDUCATION

Finance & Services Manager

Salary circa £30,000 pa.

The Institute will, on the 1st April 1989, be established as a corporate body responsible for the management of its total resources.

Before that date the Governors are seeking to appoint a person to be responsible to the Principal for the development and management of Financial, Personnel and Estate Services.

The person appointed will have had significant financial management experience, gained in a commercial environment, be a qualified Accountant with good communication skills.

For further details of this post apply to Mr. J.W. Longden, The Principal, Southampton Institute of Higher Education, East Park Terrace, Southampton, Hampshire, SO9 4WW.

Closing date for applications is Friday 16th September, 1988.

REGIONAL ACCOUNTING MANAGER

01628 28 0011
28a
Windsor

With an annual growth rate of 30%, this US owned worldwide leader in the air express industry, offers a commercially aware, qualified Accountant, a business orientated number-one position.

Responsibility will be for the control and administration of the European Accounting function. This will include the timely submission of accurate reports to the US Head Office, the development and implementation of systems and procedures and the management and training of 15 staff.

Candidates for this challenging role should be graduates, qualified Accountants. Assertive, self-motivated and able to display drive and enthusiasm, they will possess good man-management and interpersonal skills.

For further details of the above, please contact Jane Prior on 0753 857181 or 01-546 5657 (evenings) or write directly to her at Robert Half, Freeport, Mountbatten House, Victoria Street, Windsor, Berkshire SL4 1YY.

Financial Recruitment Specialists
London - Birmingham - Windsor - Manchester

INTERNAL AUDIT AND INSPECTION

Due to expansion of the London Branch of one of the largest and most prestigious Japanese Banks, a senior person is to be recruited for a new position within the specialised area of internal audit and inspection.

The successful candidate will be aged 30 - 40, with at least 5 years relevant experience in internal audit and inspection functions within a financial institution. He/she will be dedicated, hard working, have a flexible approach to work and must have the ability to control the audit and inspection operation.

He/she will be responsible for the implementation of the internal audit procedures throughout the Bank's various departments, will ensure that internal inspection procedures are complied with and will be responsible for the preparation of reports to Head office.

Applications should be made by submitting a Curriculum Vitae stating experience, salary and personal details, together with a covering letter.

Write Box A0978, Financial Times, 10 Cannon Street, London EC4P 4BY.

Only personal applications will be considered

Front office responsibility - fast-moving role

Young Accountant

City Based £22,000 + Banking Benefits

Forget routine work. Discover instead the innovation, pressure, challenge and real variety that exists in one of the UK's leading merchant banks.

You will join a 12-strong securities finance team, which provides specialist support to over 250 of the City's premier dealers. With new products and new markets emerging all the time there is no room for hesitation. You must be decisive, direct and determined, reflecting the speed and character of one of the Capital's largest dealing floors.

Your brief is to establish and develop profit and loss accounting systems for new banking products. A wide-ranging role offering an ambitious accountant the opportunity to:

- ▲ Influence the bottom-line of new products
- ▲ Enjoy "front office" responsibility
- ▲ Benefit from excellent training and prospects

Candidates, in their mid-20's, should be exceptional newly-qualified ACA's straight from public practice, or CIMA/ACCA's with impressive sharp-end commercial experience.

An attractive salary is complemented by a full range of banking benefits, and superb career prospects throughout the Group, ranging from Corporate Finance to overseas positions.

Please contact ANDREW LIVESEY on 01-404 3155 at ALDERWICK PEACHELL & PARTNERS LIMITED, Accountancy and Financial Recruitment, 125 High Holborn, London WC1V 6QA.

Alderwick & Peachell PARTNERS LTD

International Capital Markets

ACA "Big 8" Qualified

c£25,000 + first class benefits package

Sumitomo Finance International is the principal capital markets subsidiary of The Sumitomo Bank, Limited, one of the world's leading commercial banks. Founded in 1973, it is a broadly based securities house active in all sectors of the international capital market.

A rare opportunity has arisen for a graduate Chartered Accountant of outstanding ability to assume immediate control of the financial accounting function and responsibility for the management accounting function within 12 months upon promotion to Assistant Manager. You will initially be responsible for 4 staff.

You will also be expected to make a strong contribution in your first year to the documentation, review and evaluation of existing systems based on an IBM S/38 mainframe.

Interested applicants should write to Mrs. Fiona Williams, Personnel Officer, at Sumitomo Finance International, 107 Cheapside, London, EC2V 6DT enclosing a comprehensive C.V. Alternatively if you would like to discuss the position in more detail prior to applying you should contact J.M. Graham, Executive Director & Chief Accountant on 01-506 3001.

The ability to develop a rapid understanding of the business and grasp the complexities of accounting for such areas as Swaps is looked for. There will be close contact with senior Management.

Candidates should have qualified in the last 18 months with one of the "big 8" firms, have a first time pass record and be aged 24-27. Strong organisational skills and an outgoing personality are essential requirements.

Future prospects are excellent for involvement in related areas such as compliance and company administration.

European Internal Auditor

Bracknell c.£26,000 + car + benefits

We are the world's leading direct marketer of computer supplies, accessories, furniture and datacommunications products, with operations in the USA, Canada, UK, France, West Germany, Sweden, the Netherlands and Italy.

Continuing business success and dynamic growth within our European operations has now led to the need for a European Internal Auditor. Reporting to the Corporate Internal Audit Manager based in the US, he or she will test the systems of internal control for Inmac in Europe in accordance with acceptable audit standards and schedules.

Candidates should be qualified accountants with at least two years' internal audit experience. They should have good business and communication skills and fluency in a second European language is preferred. A willingness to travel throughout Europe is essential. Exposure to US business management practices through working in a European subsidiary would be a distinct advantage. Prospects for development are good.

Please write enclosing a CV to Roy Joley, European Human Resources Director, Inmac (UK) Ltd, Westley Point, Market Street, Bracknell RG12 1EW.

Instant minicomputer accessories and cables

FINANCIAL DIRECTOR DESIGNATE

£25,000 + QUALITY CAR AND BENEFITS

Our client is an office refurbishment contractor based and operating within the City and West End of London. They are a vigorous and expanding company with a management team in its middle thirties looking to increase turnover to £10m.

They wish to appoint a qualified accountant, aged 28-35 years who has a thorough appreciation of financial control systems within a contracting environment and who can take full responsibility for company and financial administration. The appointee will find positive benefits in working for a smaller company where an active contribution to company growth will be expected. He will automatically work to exacting standards both in terms of himself and others and be looking for a board appointment within the foreseeable future as an endorsement of achieved results.

Candidates who feel that their expertise and personality meet these requirements should apply in writing in strictest confidence to:

Avery Associates Limited
Ref RLW,
109 Kingsway,
London WC2B 6PZ.
Tel: 01-404 0888
Recruitment & Search consultants

Newly Qualified Management Accountancy Appointments

For the first time on September 8th, 1988 the Financial Times proposes to publish a list of the Management Accountants who have been successful in the recent Stage 4 final examinations.

The heading will be "Newly Qualified Management Accountancy Appointments", and is an ideal opportunity to recruit Management Accountants with at least three years business experience.

The advertising rate will be £4700 per single column centimetre with premium positions available by arrangement at £5700 per single column centimetre.

For further information please contact:-
Louise Hunter
Appointments Advertisement Manager
on 01-248 8000 Ext: 3588
or your usual Financial Times Representative

FINANCIAL TIMES
EUROPE'S BUSINESS NEWSPAPER

GROUP

REVISION

NIXCO

Group

London

LAWYERS

تلا من اجل

Group Finance Director

Swindon Salary and Bonus up to £50,000 + Executive Car + Share Options

Our client, a quoted plc, is a well known and highly successful leader in its consumer goods sector, and since its start-up in 1981 has generated dramatic growth in both turnover and profits. Recent acquisitions have resulted in a group with a current turnover in excess of £30m, and substantial further growth is planned.

As a result of this growth the company has identified the need for a Group Finance Director to work closely with the Group Chief Executive, and the Chairman in directing and controlling the financial affairs of the group. It presents an excellent opportunity to join the group at a demanding and challenging stage in its development.

The role is primarily one of broad commercial involvement and an expected high level of contribution to the future profitable expansion of the group, including financial strategy and acquisitions. Additional responsibilities include treasury and tax

management, consolidations, and representing the group to the city, its advisors and investors.

The ideal candidate will be a chartered accountant aged 30-40 with a demonstrable fast track career, preferably in an increasingly manufacturing company. Some exposure or at least awareness of the city would be welcomed, however of more importance is a high level of commitment, and self-motivation, a hands-on "shirt-sleeves" style and the ability to respond speedily and decisively in a high speed, rapidly changing environment.

Our client is seeking an exceptional individual - if you have the qualities to match, I would be pleased to receive your CV in application: Wayne Thomas, Executive Division, Michael Page Partnership, Windsor Bridge House, 1 Brocas Street, Eton, Berkshire SL4 6BW.

MP
Michael Page Partnership
 International Recruitment Consultants
 London Bristol Windsor St Albans Leatherhead Birmingham Nottingham
 Manchester Leeds Newcastle-upon-Tyne Glasgow & Worldwide

Group Finance Director

S.Hampshire c £40,000+ Bonus + Car

Our client is a fast expanding and profitable £70m turnover Group, part of a major British PLC. A market leader in the electronics field, the Group has a number of subsidiaries operating throughout Europe and the United States.

The Group has reached an exciting stage of development with continued high growth plans including acquisitions and additional operating sites and now seeks to appoint a dynamic Finance Director with the ability to assume a general management role and guide it into the 1990's.

Reporting to the Managing Director and supervising a team of 45, you will be responsible for directing and managing the financial activities of the Group and its subsidiaries. In addition to responsibility for financial reporting and internal controls, particular emphasis will be placed upon strategic planning and forecasting skills together with acquisition and investment experience.

The successful candidate will be a 'fast-track' graduate (or MBA) qualified accountant, aged 35-45 with several years' experience in a multi-site international finance role. Experience in a manufacturing/distribution environment would be most relevant.

Essential personal qualities will include proven management skills, presence, flexibility, drive and enthusiasm.

The remuneration package includes a performance linked bonus scheme, fully expensed executive car and BUPA.

If you can rise to my client's challenges and opportunities please submit your curriculum vitae to Mark Carrigan ACA, Regional Manager, at Michael Page Partnership, Windsor Bridge House, 1 Brocas Street, Eton, Berkshire SL4 6BW, quoting reference SV.1067.

MP
Michael Page Partnership
 International Recruitment Consultants
 London Bristol Windsor St Albans Leatherhead Birmingham Nottingham
 Manchester Leeds Newcastle-upon-Tyne Glasgow & Worldwide

INTERNATIONAL ACCOUNTANCY OPPORTUNITIES

Founded in 1982, Nixdorf Computer have grown into one of the 10 largest computer systems suppliers in the world, with a turnover in 1987 exceeding \$1 Billion. Operating in over 40 countries with a total workforce of some 30,000 personnel, Nixdorf have developed into being the number one European supplier of banking, network, small business and POS systems as well as providing consultancy, financial and field engineering services. In accordance with their policy of maintaining a truly international organisation, applications are invited for the following positions:-

GROUP ACCOUNTANCY/TEAM LEADER
DM 70-80K

The accountancy function of several companies within the Nixdorf Group require a team leader to be responsible for analysing and advising on Balance Sheets and financial statements, assisting in the preparation of world-wide consolidated accounts and the training of the groups accounting personnel. Educated to degree level, preferably in business administration, you should be a qualified accountant with several years professional experience.

COST ACCOUNTANT
DM 60-70K

You will be responsible for establishing and developing an international cost centre framework as well as providing cost analysis for board reports. Ideally you should have an economics degree together with a thorough knowledge of accounting, including computerised systems. The ability to think analytically and provide concise, accurate reports is vital.

These positions are based at the international headquarters of Nixdorf Computer in Paderborn, W. Germany and provide an excellent opportunity to gain experience with a major international organisation. A competitive salary and benefits package is available commensurate with experience.

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A guide to freelance contract work

MANAGEMENT: Marketing and Advertising

How Tonka toys with its European range

The US multinational still believes in national differences. Philip Rawstone reports

The creation of a unified European market in 1992 will not mean that a single marketing strategy can simply be devised to cover it...

Care Bears, Playdoh, Monopoly and Trivial Pursuit, in Europe, KFT has learnt that it must modify its marketing approach as it crosses almost every national frontier...

Third party licensing - the rights in spin-off products such as comics and videotapes is also handled centrally...

Consolidating such activities, says Low, saves money which can be used more effectively on local promotions...

strategy is constantly being adapted, the particular mood of different countries. The first question to be decided is often whether the US brand name will translate for the European market...

The Netherlands market, for instance, is notably sensitive to price. Dutch parents spend less on children's toys than other Europeans...

In Germany, parents strongly reject toys associated with violence. Before the MASK toy was sold there, the brand logo, originated in the US, had to be modified to get rid of some of its weaponry...

In France, the market is highly fragmented with a large number of independent retailers. Personal previews are given to the top 20 customers, but the annual toy fair is the focal point of the marketing effort...

Pirelli legs it in West Germany

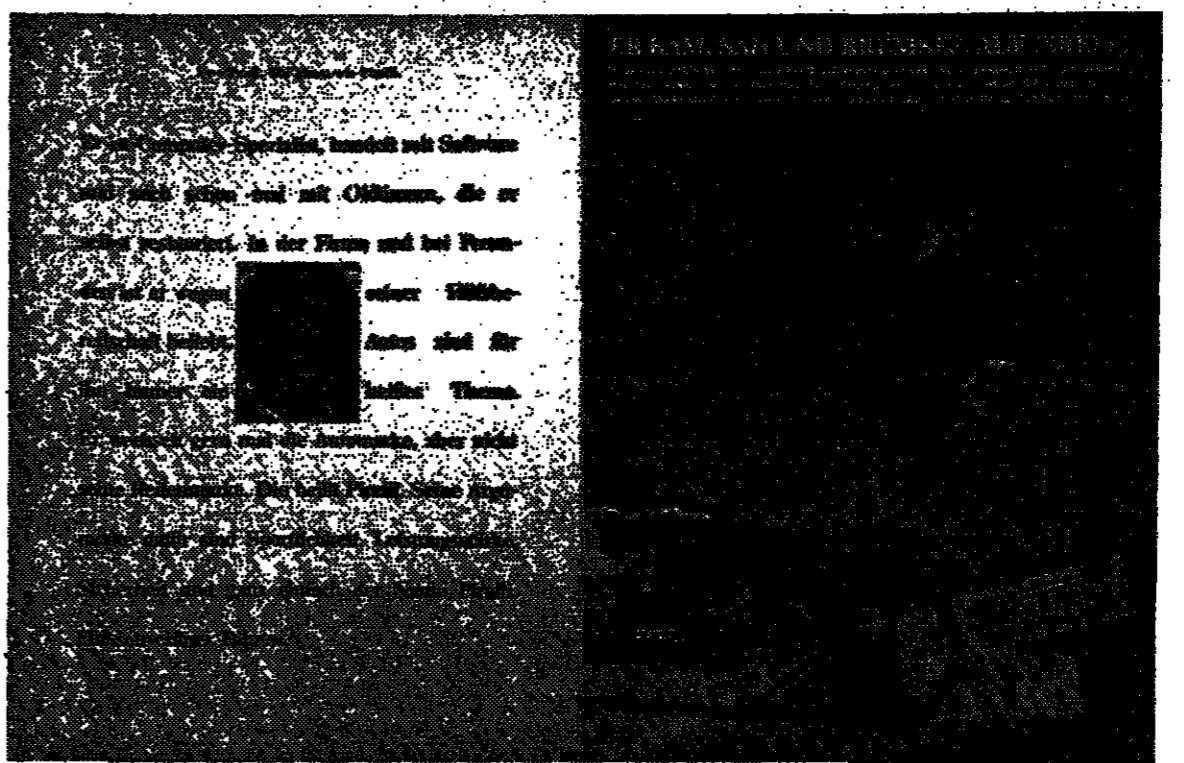
Andrew Fisher on the Italian tyre maker's innovative campaign

Selling tyres is a tricky business. Even in West Germany, one of the world's biggest and best informed car markets, many motorists have no idea which brand of grooved black rubber is wrapped round their wheels to make their ride safe, smooth, and comfortable...

The approach is emotional rather than rational, says Langner. One ad shows a casually-dressed father cruising round a suburban corner with his beaming toddler strapped on his back...

Pirelli was known as a high-performance brand with a sporty, aggressive image, says Langner. Then the image stagnated as other companies got into the performance act and the Italian company lost its exclusivity...

people questioned showed awareness of the Pirelli ads compared with 28 per cent each for Goodyear, Dunlop and Continental...



Pirelli's overall slogan translates somewhat awkwardly as "The Legs of Your Car"

Government representatives from about 100 countries are embarking on a five-week debate to sort out how each country can put communications satellites into space...



Sorting out space for satellites

Della Bradshaw assesses the prospects for international agreement on a fair way to allocate slots in orbit. Once those allocations are settled, some countries may decide to pool their allocated slots to form a sub-regional system...

too complicated and lengthy a process, and would result in a new level of bureaucracy. Other ideas mooted range from a more effective version of the existing ITU procedure to total privatisation of the bidding...

Esprit de computer THE HARWELL laboratory of the United Kingdom Atomic Energy Authority is to lead European research into the industrial uses of "neural" computing networks...

WORTH WATCHING Edited by Geoffrey Charlish mailboxes can also be provided from which users can collect material using fax machines anywhere in the world...

smart cards. Post News, based in Somerset, says that by 1990 most French consumers will have one. But the public's reaction has been mixed...

Vertical sidebar advertisement for 'BUS GUIDE' featuring a photograph of a bus and promotional text.

ARTS

GALLERIES

Curators take their pick
William Packer visits the Tate in London and the Nottingham Castle Museum

The personal anthology or common place book is a perennial fascination, and so it is with the visual arts. Judy Egerton retires this summer from a distinguished curatorial career with the Historic British Collection at the Tate...

I found the works chose me as much as vice versa. The exhibition has no beginning and no end... it is up to you. Gwen John cats, Ardizzone's view from his widdow's garden...

Detail from Edward Bawden's "Houses at Ironbridge". Miss Johnson offers no clarification of her "moments of being" but the clues lie in her notes and, above all, in the chosen works...

Offenbach's Pêrichole

KING'S THEATRE, EDINBURGH

Offenbach's Pêrichole is inexplicably less known in this country than his Hells, Orpheus or Parisian flâneurs. None of our major opera companies has come up with a production...

The first thing to remember at the Edinburgh Festival production at the King's Theatre of Le Pêrichole (the lesser hermit article, and much else, in German) is that Berlioz's Schiller Theatre is a straight theatre ensemble...

The 15-piece pit band has the sound of a scratch salon orchestra. Instead of Sally Bowles we get the incongruous Viceroy of Peru in the dapper shape of Thomas Schendel...



David Ross

The films of Sergei Parajanov

Ronald Holloway on the current cult director

Only one other contemporary Soviet filmmaker is as well known outside of his country as Andrei Tarkovsky was - the Armenian Sergei Parajanov, born (1924), raised, and currently living in Tbilisi, Georgia...

Parajanov's uncanny ability to "direct between the lines" of staid socialist-realist scripts presented to him during his early career scored as his major discovery at Munich. Presented in finely restored prints, three of these features - Andriech (1964) (co-directed by Yakov Kheselzon), The Earth (1965), Ukrainian Rhapsody (1966) - are remarkable for the purity of the colour prints...

Having viewed all of Sergei Parajanov's oeuvre, I conclude that, without Shadows of Our Forgotten Ancestors in the first place, there probably never would have been the international success of Shadows. Thus, when Parajanov at the premiere presentation of his Ashik Kerib requested a minute of silence in memory of Tarkovsky...

Poppy

HALF MOON

Six years after an RSC premiere that left its author far from happy, Peter Nichols' musical pantomime about the opium wars resurfaces revamped and revitalised at "the sort of venue it is made for - although the stark concrete expanse of Steppenwolf Half Moon Theatre is rendered almost unrecognisable by a set by Ellen Cairns of cardboard cut-out opulence...

The company is vocally uneven and needs time to settle into its stride, but is undeniably scruffy around the edges but it harnesses the corny inventiveness of good old-fashioned pantomime in a way that could certainly not be written off as coy or pretentious...

New season at the Young Vic. The Young Vic opens its 18th birthday season on October 6 with the London premiere of Arthur Miller's adaptation of Henrik Ibsen's An Enemy of the People.

SALEROOM

Record for Scottish artist

Sotheby's had the time of its life at Gleneagles Hotel on Tuesday night selling off Scottish pictures for a record £2m, with a painting by Francis Cadell making a remarkable £214,500, easily an auction record price for any work by a Scottish artist.

Another Glasgow Boy who has attracted Japanese interest is Edward Atkinson Hornel, and "The wicker wood," a rather formulaic portrayal of two young girls in a forest, was near the top of its estimate, selling for £46,200 to the Gerber Gallery of Glasgow.

ARTS GUIDE

Paris: Carte Musée de Monuments, sold in museums and Metro stations, enables visitors to avoid queues at the Louvre, Musée d'Orsay and Versailles. The Fifties, taking over Beaubourg for three months from the ground floor upwards. The poster creative dimension of the Fifties is represented by cars, comics, music, cinema, literature, industrial creation and - on the fifth floor - by visual art.

Virgin Mary from the austere figure of the Middle Ages to the more human Renaissance and Baroque portraits. Ends Oct 4. Martyr: The Glasnevin Foundation is showing the second part of its treasure on loan from the Sao Paulo Museum. Ends Sept 6.

Aug 26-Sept 1. Tokyo National Museum. The Splendor of Turkish Civilization: Ottoman Treasures from the Topkapli Palace. The former Seraglio of the Sultans in Istanbul boasts a magnificent collection of Ottoman Empire, from the 16th to 19th centuries. Highlights include a steel helmet incrustated with precious rubies, turquoise and amethysts, and a wooden throne inlaid with

FINANCIAL TIMES COMPANIES & MARKETS

Thursday September 1 1988

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INSIDE

Inland Steel shows mettle of success

Chicago's Inland Steel is riding high on a boom in the US steel market. With recent earnings in sight for this year, the company is looking to improve the quality of its products to maintain earnings growth even in another steel downturn.

Hard times for some in Tokyo

Hoping for huge profits, foreign banks lobbied hard for the deregulation of the Japanese financial markets. But the subsequent intense competition has slashed both their market share and profitability.

United Nations liberates African women for field work

In the Gambian village of Njau, Fama Coesay used to rise before dawn to thresh and dehusk millet, then go to work in the fields. But today, thanks to a unique project sponsored by the United Nations Development Fund for Women, she and many other women have been liberated from hours of drudgery.

Market debut for Ferruzzi unit

The reorganisation of the Italian Ferruzzi-Montedison empire passed a critical juncture today with the stock market debut of Ferruzzi Finanziaria (Ferrin), the holding company previously controlled by the Ferruzzi family.

Alusuisse back in the black

Alusuisse, Swiss light metals and chemicals group, has returned to profitability in 1988, after an absence of three years. Hans Jucker, chief executive, attributed the improvement to "the excellent economic situation, the corresponding demand for bulk products and the sharp rise in the aluminium price."

BSR merger talks dropped

BSR International, Hong Kong-based electronics group, has called off merger discussions with an unnamed third party. The company said it was confident it could expand its electronics activities independently.

Market Statistics table with columns for various market indices and their values.

Companies in this section

Table listing various companies and their share prices, including Alusuisse, American Trust, and others.

Chief price changes yesterday

Table showing price changes for various companies like BHP, British Steel, and others.

VW sales soar as demand rises in foreign markets

As announced in July, Volkswagen's group net profit in the first half was 2 per cent higher at DM310m (\$166m) on turnover which was up by 5 per cent to DM29.1bn. The improvement has come entirely in foreign markets, with strong performances in Italy, Spain, and France.

Nippon Mining lured by Gould marriage prospects

Ian Rodger and Anatole Kaletsky look at the growing attraction of foreign bids for Japanese industry

This week's agreed \$1.1bn bid for Gould, US electronics group, from Nippon Mining might have been specially arranged to show the contrast between American and Japanese attempts to shift old-line industrial companies from a dependence on out-moded products to a technologically-led growth.

The deal bears some of the characteristics of the trend in recent years for Japanese companies in mature sectors to develop new businesses in high technology areas: the old shipbuilders, such as Mitsubishi Heavy Industries, are all piling into electronics and machinery, such as Nippon Steel, have been dabbling in electronics and new materials.

It would, that, suggest, however, that both Nippon's existing businesses, in oil and non-ferrous metals, have little or no future, especially for a company with leading positions in each.

Similar diversifications have been attempted over the years by numerous American industrial groups, but with mixed results. Gould may never have been one of America's most successful companies but five years ago it seemed a respectable example of just the kind of transformation Nippon Mining is now undertaking.

The takeover is also one of the more dramatic examples of another important trend in Japanese industrial strategy. Thanks to the high yen and high share prices in Tokyo, Japanese companies can now afford to buy their way into foreign businesses and technologies which they could not have dreamed of acquiring three years ago.

It is an indication of how terribly cheap US assets are for Japanese companies, says Mr Steve Eshkolov, general manager of stockbroker W.I. Carr in Tokyo. He and others have no doubts that the trend for Japanese companies to acquire US businesses will accelerate in the next few months.

However, the Nippon Mining move is on a much larger scale than the high-tech diversifications seen previously, reflecting the clout given by the high yen. Nippon Mining's consolidated net profits of ¥7.5bn in the year to March come out at \$64m when expressed in dollars, more than double that of Gould, even though the US company has twice as many employees as the Japanese group.

Additionally, high Japanese share values mean Nippon Mining, which has a price earnings ratio of more than 50 and a market capitalisation of something like \$3.5bn, can raise \$1.1bn with ease.

Mr Hideo Ishihara, managing director of Industrial Bank of Japan (IBJ), Nippon Mining's main financial adviser, said yesterday Japanese companies were finally becoming "more open minded" about acquisitions. Until recently, they preferred to do only greenfield or joint ventures when expanding overseas.

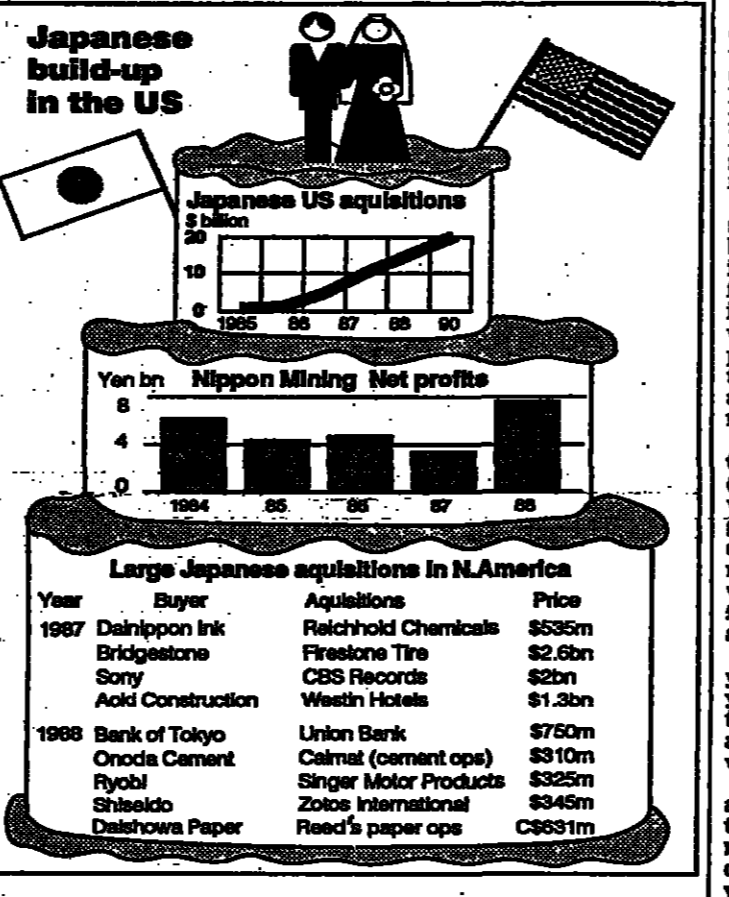


Table titled 'Large Japanese acquisitions in N.America' listing buyers, acquisitions, and prices.

Racal may not float telecoms

By Hugo Dixon in London

RACAL, the British electronics group, may be forced to postpone the flotation of its telecommunications subsidiary because of the decline in London stock market prices, one of the company's financial advisers said yesterday.

A delay in floating Racal Telecom, whose flagship is Vodafone, the mobile phone operator, would also prevent Racal from raising the funds it has said it needs to invest in its other businesses.

It might even lead to a resumption of bid rumours over Racal. The company is widely believed to have decided on the flotation plan in order to boost its share price and so deter predators, notably Cable & Wireless, the international telecommunications group, which then held 2.5 per cent of its equity.

Racal wants to float 20 per cent of Racal Telecom rather than the 25 per cent normally demanded by the London Stock Exchange. The Stock Exchange is therefore insisting that at least £350m in equity is floated, giving Racal Telecom a minimum value of £1.75bn.

One of Racal's financial advisers said the issue would have to be pulled if it was taking place in today's markets. He was hopeful that conditions would improve by the end of October, when the flotation is due to take place, but said there was concern that this date was close to the anniversary of last year's stock market crash.

One of Racal's leading institutional shareholders said: "They (Racal) have got problems. It would be foolhardy for them to go ahead just because they feel committed to it." He said he would not now underwrite a flotation valuing Racal Telecom at £1.75bn, although he would have a few weeks ago.

Racal's shares closed at 364p yesterday compared with a yearly high of 351p soon after the flotation plan was announced. The present price values the group at £1.9bn.

Mr Stephen Owen, an analyst at James Capel, said this meant the stock market was putting a notional value on Racal Telecom of only £1.1bn-£1.2bn, when the value of the other businesses was subtracted.

Dutch claim bid victory for UK property group

By Nikki Taft in London

THE BID battle for Peachey Property Corporation, the UK property company which owns London's Carnaby Street, came to a swift conclusion yesterday after Wereldhave, the Dutch predator, raised its offer and Casanova, its stockbroker, swept into the market for Peachey shares.

The new offer, however, is still pitched at a near-4 per cent discount to Peachey's latest estimated asset valuation. This was conducted on August 24 and suggested net assets of 676p per share.

The defeat was greeted with a deafening silence from the Peachey camp. The company itself refused to talk, although Warburgs, its advisers, conceded that the Dutch company appeared to have control. The company was still considering its recommendation to shareholders last night, having earlier noted the higher offer and advised shareholders to take no action.

Wereldhave itself rebutted suggestions that it had overpaid for Peachey by bidding towards the top of the UK property cycle. "If you compare the UK market with prospects on the Continent, there is still a lot more potential here," the Dutch said yesterday.

Advance for two Maxwell ambitions

By Clay Harris and Raymond Snoddy in London

THE acquisitive international ambitions of Mr Robert Maxwell, the British publisher, advanced on two fronts yesterday. Mr Maxwell expressed confidence about the £2.57bn bid by Maxwell Communication Corporation, his printing and publishing group, for Macmillan after a meeting in London with Mr Edward Evans, chairman of the US publisher.

Meanwhile, Pergamon Professional and Financial Services, one of his stock market vehicles, won AGB Research's recommendation for a takeover bid valuing Britain's largest market research group at £134m.

The likelihood is growing that MCC will at least get Macmillan's information services division - for which it has already put forward an alternative £1.1bn offer - if not the mainstream book publishing business.

Mr Maxwell said: "Our current intention is to acquire the whole of Macmillan, but if the management prefers to sell only the information side and we can agree a price and it is within the rules, we are prepared to look at it."

Further talks are to be held in New York next week. In London, meanwhile, Pergamon, called Hollis until it sold its engineering businesses in May, said the acquisition of AGB would enable it to expand its interests from the existing range of legal and employment services, educational supplies, and software for school administration.

Yesterday's bid thwarted a previously agreed deal under which MAI, the British money-broker and advertising group, was to have raised its stake from 9.6 per cent to nearly 30 per cent by injecting its own US market research operation, MRI, into AGB.

Pergamon, which bought nearly 15 per cent of AGB shares in the market last week, is offering convertible loan stock valued at 236p per share, with a cash alternative of 220p.

MCC yesterday announced a 33 per cent jump in operating profits for the six months to June 30.

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INTERNATIONAL COMPANIES AND FINANCE

Alusuisse hopes to resume payout

By John Wicks in Zurich

ALUSUISSE, the Swiss light metals and chemicals group, hopes to resume dividend payments this year after an absence of three years.

The company, which ran up losses totalling SF1.3bn (\$220m) in 1985 and 1986, had returned to health sooner than expected, Mr Hans Jucker, the chief executive, said yesterday.

He attributed the improvement to "the excellent economic situation, the corresponding demand for bulk products and the sharp rise in the aluminium price."

Parent company income before extraordinary items was

expected to more than double this year, Mr Jucker said.

In 1987 Alusuisse turned in a profit of SF220m (at this level against a SF294.1m loss in 1986). After extraordinary items, parent company net earnings last year totalled SF74.4m against losses of SF264.9m.

The company reports good business in both the aluminium and chemical divisions for the first half of this year. Group turnover rose by 14 per cent to SF12.88bn.

Second-half sales and earnings are expected to be of the same order as those for January-June. Cash flow, which grew from SF190m to SF280m

in the first half, should be enough to finance an "exceptionally high level of investment," put at around SF500m.

Mr Jucker said Alusuisse's activities, at both operating and holding company levels, had fiscal disadvantages. As a result, reorganisation based on the formation of a holding company to act as group parent is expected in about a year.

The company plans to return to the capital market next week with a SF150m, eight-year bond issue bearing a 4.75 per cent coupon. Subordinated bank loans would be gradually repaid from the proceeds of

this transaction and from cash flow.

Alusuisse also announced that it has acquired a 50 per cent stake in the German packaging company Weidenhamer Packungen, a specialist in composite cans with 400 employees and annual sales of DM60m (\$32.2m). The group is also negotiating to take over a plastics processor in Germany.

Alusuisse is also to participate with Amag (Austria), Hoo-govens (Netherlands) and Ganges (Sweden) in the creation of a second aluminium smelter in Iceland with a final capacity of 200,000 annual tonnes.

ABB heads for strong profit gain in 1989

By Sara Webb in Stockholm

ASEA BROWN BOVERI (ABB), the Swedish-Swiss electrical engineering group, yesterday reported profits (after financial items) of \$200m for the first six months of its existence. The group said this was roughly in line with expectations despite high merger costs.

ABB forecast strong increases in profits for 1989 when the effects of its massive restructuring would start to emerge. The group is in the process of decentralising, reducing overheads and combining its distribution and sales forces, which it expects to lead to lower production and distribution costs, and greatly improved market coverage.

Turnover totalled \$8.50bn, an increase of 30 per cent for comparable units since acquisitions and divestments are taken into account. Order intake amounted to \$9.28bn in the first half, a 15 per cent rise adjusting for acquisitions and disposals.

ABB took over the electrical engineering operations of Asea of Sweden and Brown Boveri of Switzerland with effect from January 1988 and is owned equally by Asea and Brown Boveri. ABB said there was considerable scope for improving earnings in most of its business areas and regions. It expects earnings for the second half to be higher than in the first six months.

Market debut for Ferruzzi Finanziaria

By John Wyles in Milan

MR RAUL GARDINI'S reorganisation of his Ferruzzi-Montedison empire passes a milestone today with the stock market debut of Ferruzzi Finanziaria (FFin), the holding company previously controlled by the Ferruzzi family.

Ferdin arrives at the Milan and Bologna stock exchanges as a result of the fusion between Ferruzzi Finanziaria and Indistiva META, the property, retailing and financial services company hitherto 64 per cent controlled by Montedison.

The venture is not without some sacrifice for the four heirs of the company's founder, Mr Serafino Ferruzzi (Mr Gardini's father-in-law) since their holding will fall from 100 per cent to just under

40 per cent.

This level of shareholding is seen as sufficient for the Agnelli family to maintain control of META, but if it does not prevail at Ferruzzi, the family says it will raise its holding.

In material terms, most analysts believe that Mr Gardini and his family are doing well out of the fusion.

According to the FFin prospectus, META shareholders are receiving 15 FFin for four META, a valuation which was initially judged by many to be on the modest side, and which has remained unaltered despite the disposal of a 70 per cent stake in the Standa retailing chain to the television magnate Mr Silvio Berlusconi for L969bn (\$700m).

The FFin prospectus says



Raul Gardini doing well out of the merger

On the basis of yesterday's closing price for META, FFin shares should open at about L2,920 today, giving the Ferruzzi group a market capitalisation of close to L3,410bn.

Initially, Montedison will be holding just over 32 per cent of its parent company but since such a cross shareholding is forbidden by Italian law, it will offer these FFin shares to its stockholders sometime before November of next year.

This sale is expected to make a contribution of around L1,200bn to Mr Gardini's crash programme for cutting Montedison and Ferruzzi's combined borrowings, which at the beginning of the year stood at around L11,000bn.

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May 1988

Hachette in Spanish books deal

By George Graham in Paris

HACHETTE, the leading French publisher, has agreed to buy Salvat, the fifth largest publishing house in Spain, for around FF350m (\$65.3m).

The purchase of Salvat follows Hachette's two big US acquisitions earlier this year of Diamandis, the magazine group, for \$712m, and of Grolier, the encyclopaedia publisher, for \$470m.

Like Grolier, Salvat specialises in the reference books market and is expected to give Hachette a strong foothold in the expanding Spanish language publishing market.

Around a quarter of Salvat's sales are already in Latin America.

Hachette, which is expected to make profits of around FF220m on sales of around FF220m this year, had built up a large cash position in anticipation of being awarded the licence for France's main television channel last year.

Most of this position has been used on acquisitions, but the group is expected to raise up to FF12bn more from the sale of an important Paris property, site of Hachette's 49 per cent subsidiary, Nouvelles Messageries de la Presse Parisienne, the leading French newspaper distributor.

Chargeurs, the industrial holding company, is discussing the sale of its Spontex unit with Minnesota Mining and Manufacturing of the US. Spontex specialises in cleaning materials and sponges.

Two Dutch publishers buoyant

By Laura Raun in Amsterdam

ELSEVIER and Wolters Kluwer, the two big Dutch publishers, reported buoyant first-half earnings thanks to strong profits from their scientific and professional publications.

Both companies also forecast higher profits for 1988 as a whole, rounding out a picture of a healthy publishing industry. Earlier this week, VNU, the largest local publishing group, announced a 42 per cent gain in first-half net profit.

Elsevier said its earnings surged 25 per cent to Fl 101m (\$48m) from Fl 81m following across-the-board improvements, including the traditionally strong scientific journals. Strong advertising revenue at Elsevier's two newspapers also helped.

However, per share earnings rose a more modest 18 per cent to Fl 1.88 as a result of shares issued at the time of the company's bid battle with Wolters Kluwer for the Kluwer group.

Elsevier, which ranks number three among publishers, emerged from the takeover tussle with a 33 per cent stake in Wolters Kluwer. Its net working capital fell 29 per cent to Fl 169.5m from Fl 240m because of the costs involved in acquiring the Wolters Kluwer stake, although the dividend income helped fuel a rise in earnings from non-consolidated companies.

Profits at Wolters Kluwer climbed 20 per cent to Fl 36m.

Opening in Frankfurt

SUMITOMO BANK

is pleased to announce the opening of its new subsidiary on the 1st of September 1988.

The main businesses are:

- underwriting
- sales
- and dealing

of DM securities.

Please contact the Managing Directors

Mr. Dr. Michael Osthoff
and Mr. Yoshimitsu Okamoto.

Mr. Katsuhiko Noguchi
Advisor to the Management

SUMITOMO BANK (DEUTSCHLAND) GMBH
Hamburger Allee 2-10, D-6000 Frankfurt am Main 90
Telephone (69) 7 96 06-2, Telex 4 170 707, Telex (69) 70 60 75

Credit Commercial de France

U.S. \$250,000,000

Floating Rate Notes due 1994

For the six months 30th August, 1988 to 28th February, 1989 the Notes will carry an interest rate of 9.04% per annum with a coupon amount of U.S. \$457.02 per U.S. \$10,000 Note. The relevant interest payment date will be 28th February, 1989.

Listed on the Luxembourg Stock Exchange

Bankers Trust Company, London Agent Bank

Creditanstalt-Bankverein

U.S. \$150,000,000

Subordinated Floating Rate Notes 1996

For the six months 30th August, 1988 to 28th February, 1989 the Notes will carry an interest rate of 9 3/4% per annum and coupon amount of U.S. \$229.08, payable on 28th February, 1989.

Bankers Trust Company, London Agent Bank

Their Bonds having been sold, this announcement appears as a matter of record only.

U.S. \$140,000,000

Osaka Prefecture

9 3/4 per cent. Guaranteed Bonds Due 1993

unconditionally and irrevocably guaranteed as to payment of principal and interest by

Japan

Issue Price 101 1/2 per cent.

Bank of Tokyo Capital Markets Group Daiwa Bank (Capital Management) Limited
J. P. Morgan Securities Ltd.
Banque Paribas Capital Markets Limited Chase Investment Bank
Credit Suisse First Boston Limited Daiwa Europe Limited
Deutsche Bank Capital Markets Limited Goldman Sachs International Corp.
IBJ International Limited Kleinwort Benson Limited
Kreditbank International Group Merrill Lynch International & Co.
Morgan Stanley International Nomura International Limited
Salomon Brothers International Limited Sanwa International Limited
Sumitomo Finance International SBCI Swiss Bank Corporation Investment banking
Union Bank of Switzerland (Securities) Limited S.G. Warburg Securities
Yamaichi International (Europe) Limited

NEW ISSUE AUGUST 1988

THE KINGDOM OF DENMARK

€100,000,000

Floating Rate Notes due 1998

In accordance with the provisions of the Notes and the Agent Bank Agreement between The Kingdom of Denmark and Citibank, N.A., dated 22 November, 1983, notice is hereby given that the Rate of Interest has been fixed at 12.5% pa and that the interest payable on the relevant Interest Payment Date, November 30, 1988, against Coupon No. 20 will be £1,553.96.

September 7, 1988, London Fiscal Agent
By: Citibank, N.A., (CSSI Dept.), CITIBANK

Weekly net asset value
Tokyo Pacific Holdings (Seaboard) NV
on 29/8 US 155.49
Listed on the Amsterdam Stock Exchange
Information: Persoon, Holding & Pierson NV.

Interest Rate Change

Allied Irish Banks plc announces that with effect from close of business on 30th August 1988, its Base Rate was increased from 11% to 12% p.a.

Bankcentre - Britain, Belmont Road, Uxbridge, Middlesex UB8 1SA. Tel: (0895) 72222 and branches throughout the country.

NEW INTEREST RATES

Increased by % p.a.	PERSONAL LENDING	Interest rate % p.a.	Annual percentage rate %
With effect from 1st September 1988			
1.50	Home Improvement Loan	14.00	15.00
1.00	HomeOwner Reserve	16.00	16.90
1.80	Home Management Account	21.00	22.70
3.00	Vector	21.00	22.70
3.00	CheckOver	21.00	22.70
3.00	Standard Debit Interest Rate	27.00	29.80
With effect from 29th September 1988			
1.20	FlexiLoan	19.20	20.90
1.50	Save and Borrow Account	21.00	22.70

MIDLAND

The Listening Bank

MIDLAND BANK PLC, 27 POULTRY, LONDON EC2P 2BX

INTERNATIONAL CAPITAL MARKETS AND COMPANIES

Foreign banks find going hard in Tokyo

Stefan Wagstyl looks at a post-deregulation dilemma

FOREIGN BANKS in Japan have been left behind by the explosive growth of the Tokyo financial markets. With a few conspicuous exceptions, they have failed to take advantage of Japan's financial liberalisation in the 1980s. And in the face of intense competition from the Japanese banks, they are unlikely to find the next five years any easier than the last five.

Also, there are markets in which overseas banks do well, notably foreign exchange, where they have the advantages of skilled staff, strong international links and a long-established presence in Tokyo. But even here foreign banks' market share has fallen, from 38.5 per cent to 31.4 per cent since 1979. Moreover, foreigners as a group - with significant exceptions - have failed to turn this bastion into a platform for launching attacks on other markets.

The full-service banks were among the first to establish themselves in Tokyo after the Second World War and grew into the biggest foreign lenders to Japanese industry. But in the 1980s they have been forced to cut their assets, largely because they were particularly severely hit by Third World debts. In Japan, these banks have been selling loans to other companies - mainly Japanese regional banks and life insurers.

Costs have also been cut. Chase Manhattan has reduced the new international rules. Dr Hans-Dieter Launmeyer, general manager of Deutsche Bank in Japan, says the Europeans are filling a need for loans in the market, as Japanese banks are close to their self-imposed lending limits.

There are doubts about the quality of some of this business. Many Japanese companies turn to foreign banks not for long-term capital investment loans but for short-term funds to play the money market - an activity called *zaitei*. The risks on these investments are usually very low, but so are the banks' margins. Moreover, it is a thin basis for building a long-term relationship with a company.

It was not meant to be like this. Before the Japanese authorities began to deregulate financial markets in the early 1980s, it was widely supposed by bankers that liberalisation would open opportunities for profit. US and European banks lobbied eagerly for the chance to compete directly with the Japanese banks in serving Japanese industry.

But in practice, it is the Japanese banks which have gained most from deregulation - taking advantage of rule changes which allowed them into fields previously reserved for foreigners.

European banks in particular are still expanding their business in Japan. Both Barclays and National Westminster, the two largest UK banks, have invested in upgrading their operations in the past year. They hope that contacts made in Japan will win business from the growing number of Japanese companies established in Britain. This desire for closer links is also reflected in NatWest's plans yesterday for a Tokyo share issue.

Collectively, however, foreign banks are in a worse position than they were before liberalisation began. The foreign share of the assets of financial institutions has fallen from 4.4 per cent in 1979 to 3.8 per cent last year, according to the Bank of Japan.

The foreigners' share of the profits cake has shrunk to a few crumbs - from 3 per cent of total bank profits in 1979 to less than 1 per cent last year. The figures, prepared for the Japanese tax authorities, almost certainly make things look worse than they are. Moreover, much of the benefit of operating in Tokyo accrues elsewhere - Japan business from Japanese companies in the US or the UK, for example.

Table with 5 columns: Bank Name, Ybn, (1987), 1988, (1987), Ybn. Lists top ten foreign banks in Japan by balance sheet size and pre-tax profits.

banks go from here? How can they continue to justify the cost of staying on in Tokyo when net return on assets last year averaged 0.15 per cent, about half the level for Japanese banks?

Banks say there are two fundamental reasons why business has been so difficult. The first is that Japanese companies prefer to stick to long relationships with their bankers. So newcomers have to spend much more time than elsewhere building contacts with their clients.

Even then, Japanese companies usually do not give foreigners more than a small slice of their business. So the foreign penetration in the market is lower than in the US or in the UK.

Next, foreigners have little access to the huge pool of Japanese savers' deposits, where Japanese banks raise the bulk of their funds. Instead, overseas banks which want to lend first have to borrow the funds in the money market. In the 1980s, Japanese companies' credit ratings have increased relentlessly as their cash reserves have grown - so bank margins have declined.

US banks, the traditional leaders among foreign banks in Tokyo, have reacted by cutting their loan books and putting a

to build relations with Japanese industry. As a result, while European banks top the list in terms of assets, a small group of medium-sized US banks is the most successful in terms of profits.

Bankers Trust, Chemical Bank, Morgan Guaranty Trust and Irving Trust were among the first to switch the emphasis from lending to providing commission-based services. They boost this income by own-account trading, which in a good year - when markets are volatile - can generate substantial extra profits.

These banks sell skills in treasury management, in foreign exchange, money markets, and corporate finance. They tend to concentrate on the biggest Japanese companies - those which are often the most receptive to changes in treasury management.

The aim is to stay a step ahead of Japanese banks which are quick to copy successful new products. "Just renting out the balance sheet in Japan is a mug's game," says an executive at one of these banks.

The giant US retail banks, headed by Citicorp, Bank of America and Chase Manhattan, have taken longer to turn from assets to profits - not least because they are carrying much larger loan books.

its total payroll from 660 to 680, for example, and Citicorp has trimmed its main banking staff by 100 to 400. Continental Illinois has closed its office in Osaka. Even top executives are having to live with the times.

Chase has sold its general manager's landmark residence. The picture is not entirely negative. Although Citicorp, for example, incurred a pre-tax loss last year of ¥2.78bn, much of this was accounted for by investments in services to retail customers. Unlike other foreign banks Citicorp is aggressively pursuing the individual customer. It plans to expand its branch network from six to perhaps 20 to 30 outlets. The consumer services staff has been increased by more than 100 to 500 in the past three years, cancelling out the cuts in the main corporate banking division.

As the US banks shrink their balance sheets, so the European banks are expanding. Mr Koichiro Kitade, country treasurer for Citicorp, says: "The European strategy is totally different from ours."

The Europeans have supplanted the big US banks as the biggest foreign lenders in Tokyo. With stronger balance sheets, they can afford to increase their loan books without worrying so much about

Nevertheless, European banks see this as a way of getting a foot in the door, enabling them to sell more profitable services such as treasury skills. "Lending is often a loss-leader," says Mr Stuart Matthews, banking analyst at BZW, the securities arm of Barclays Bank.

For Europeans and Americans alike, the trick will be identifying fields where they have a potential competitive edge over Japanese rivals, for example, serving subsidiaries of Japanese companies abroad.

It is also possible that further financial deregulation might work in the foreigners' favour. Full liberalisation of interest rates might allow overseas banks greater access to Japanese savings, which are a perennial source of cheap funds for Japanese banks.

However, more deregulation may simply mean more competition. For example, plans to further liberalise foreign exchange might allow Japanese securities companies (as well as foreign ones) greater access to the markets.

One British banker says despondently: "I can tell you we should be in niches in five years' time. But I can't say what they're going to be."

Some banks can hope to keep far enough ahead of the pack to make money from their niches, but the rest will be left wondering whether the prestige of being in Tokyo is worth the considerable cost.

Eurodollar issues shelved after sharp fall of yen

By Our Euromarkets Staff

A SHARP fall in the yen against the dollar, after weeks of stability, threw several sections of the Eurodollar market into disarray, forcing the postponement of several new dollar issues and an equity warrant bond.

The turmoil began after the close of Tokyo stock and bond markets yesterday when officials of Japan's central bank said the yen's recent weakness against the dollar was too insignificant to require a change in the discount rate.

The remarks promptly pushed US Treasury bonds more than a half-point higher and sent Japanese government bonds tumbling. In addition, equity warrant bond prices fell over a point in the primary market, while in the secondary market traders said prices of the warrants themselves fell by about 20 per cent.

"It was one of the half-dozen worst days we've ever had," said a trader at one secondary market-maker.

While the Bank of Japan's comments on its own currency came after the close of stock exchanges, the widespread expectation is that the key Nikkei index will open sharply lower today, reflecting increasing investor anxiety about the yen's latest major fall against the dollar.

Current starting rates cause equity warrants to lose 4.2 per cent in price for every 1 per cent drop in the underlying stock price. Daiwa Securities was said to have postponed the launch of a \$100m equity warrant bond offering for Marubeni Food due to the drop in the equity war-

rant market. The firm fixed the coupon on \$200m equity warrant bonds for railway operator Hankyu at the indicated 4 1/2 per cent level, but said the issue is trading at a hefty discount, of 96 bid.

In the primary market, the dollar's surge unnerved the markets by driving up the prices of US Treasury bonds by as much as a half-point. Eurodollar bonds, meanwhile, were unchanged to a more modest 1/4 point higher, as sales by Japanese investors cashing in on currency gains held prices in check.

INTERNATIONAL BONDS

As a result of wider spreads between Treasuries and Eurobonds, the window snapped shut on the fingers of underwriters hoping to launch a series of new fixed-rate dollar Eurobonds and swap the proceeds into floating rate funds. A single straight dollar Eurobond was launched, leaving deals for several other borrowers still in the pipeline.

Finnish Export Credit issued a \$150m three-year Eurobond via Mitsubishi Finance. The AAA-rated bonds carry a 9 1/2 per cent coupon and a 101 1/2 issue price to yield 4 1/2 basis points over Treasuries. The bonds closed inside the 1% per cent fees.

Meanwhile, yields on Japanese government bonds rose more than 10 basis points, an unusually large move for London trading day. Euroyen

bond prices fell a much more modest 1/2 point among shorter issues, with prices supported by a general shortage of paper. Deutsche Bank Finance, a financing unit of Deutsche Bank, issued a \$100m six-year issue with a 6 per cent coupon and priced at 100 1/2. The issue was lead managed by the parent which also guaranteed the bonds.

West German domestic and Eurobond prices eased. Deutsche bond prices fell by as many as 25 basis points on the dollar's strength while the announcement of a new federal government bond next Monday also hurt sentiment. Eurobonds opened firmer in line with the US Treasuries, but slipped from the day's highs as the dollar firmed. Prices eased unchanged to slightly easier.

The markets are awaiting the Bundesbank's announcement today on whether it will add more liquidity when it replaces a repurchase agreement of DM250bn.

The Swiss straight bond market ended the day narrowly mixed, although Japanese equity-linked issues eased in line with the Tokyo stock market.

Two new Japanese borrowers issued convertible debt in Switzerland as private placements. Japan Air System launched a \$500m five-year issue with an indicated coupon of 7 1/2 per cent, while Apollo Electronics issued a \$500m issue, also with a 7 1/2 per cent indicated coupon. Indicated yields to par on the two issues are 8.47 per cent and 3.22 per cent respectively.

Dead Sea Works 30% up at midway

DEAD SEA Works, the Israeli chemicals company, reports a 30 per cent increase in first-half net profits to \$26m, mainly on the strength of improved world prices for potash, writes Andrew Whitley in Jerusalem. Sales at the state-controlled

company grew by the same proportion as exports rose strongly. Dead Sea Works produces potassium chloride, magnesium chloride, table salt and bath salts from deposits in and around the inland sea. Dead Sea Bromine, a subdi-

lary which is one of the world's largest producers of bromine compounds, doubled net profits to \$8m, in line with the general recovery being enjoyed by the Israeli chemical and petrochemical industries.

FT INTERNATIONAL BOND SERVICE

Listed are the latest international bonds for which there is an adequate secondary market. Closing prices on August 31

Large table with multiple columns: Bond Name, Issued, Bid, Offer, Yield, Change. Lists various international bonds and their market performance.

Crash plunges Australian broker into red

By Bruce Jacques in Sydney

JACKSONS, Australia's first listed stockbroker, slipped into the red for the year to June, showing the effects of the October share crash.

Mr Bob Pflaffin, group managing director, yesterday announced a \$47.7m (¥582m) net loss for the period, compared with \$66.2m profits. The result largely reflects an effective ASX provision for doubtful debts.

Jacksons, a leading underwriter of the more speculative boom listings, was floated in July 1987 near the peak of the bull market at \$44 a share, but its shares have fallen to around 70 cents following disclosure of a first-half loss of \$52.3m. Yesterday's announcement confirmed that losses continued following the crash, forcing the group to carry out a restructuring.

Mr Pflaffin said the company had returned to the black since June. Jacksons has now successfully restructured its scrip administration department, introduced a new finance broking service which is generating profit, developed an active operations team and shifted its stockbroking emphasis to lower stock prices supported more by selective research.

McIntosh Securities, the only other listed Australian broker, has yet to report its results.

Japanese stores group plans HK unit flotation

By John Elliott in Hong Kong

YAOHAN HONGKONG, owned by Yachan Departmentstore of Japan, is to raise HK\$75m (US\$9.6m) by floating a quarter of its shares on the Hong Kong Stock Exchange.

It will be the second Japanese company to obtain a Hong Kong quotation. The first was Kumagai Gumi, the construction company which floated its local unit in May last year. Japan is playing an increasingly significant role in Hong Kong's economy and it already has a big presence in the stores sector. Yachan Hongkong operates two stores and is planning to use funds raised by the flotation to finance a third. The 75m shares are priced at HK\$1 each. Applications will close next Tuesday and dealings are expected to start on September 22.

Advertisement for SKF bearings. Includes text: 'A show of strength', 'We are proud to sell quality solutions...', 'Sales of the SKF Group for the six months ended June 30, 1988 rose 6.9 percent to SEK 10,588 million...'. Also includes a bar chart showing sales and income from 1987 to 1988.

CURRENCIES, MONEY AND CAPITAL MARKETS

FOREIGN EXCHANGES

Rate differentials hit yen

A WRACKER yen was the main feature in a foreign exchange market lacking major economic news yesterday. The dollar's undertone was firm, with Europe doing little more than continuing a trend seen on Tuesday in New York and then in the Far East.

The yen weakened initially against the US currency on a news report that the Japanese Finance Ministry intends to set a tax of 26 pc on certain stock exchange transactions. But dealers said there was nothing new in this suggestion, and it was really just an excuse to buy the dollar.

Against the D-Mark, as sterling weakened later in the morning, gilts and equities began to slide. Interest rates were slightly firmer where changed, against a background of continued nervousness about Britain's trade position.

FINANCIAL FUTURES

US bond prices firmer

US TREASURY bonds were marked up in Life trading yesterday, underpinned by a stronger dollar - notably against the Japanese yen. Values were boosted after reports that the Bank of Japan had no plans to increase its discount rate.

However trading volume in the September contract was barely over the 10,000 level, as many institutions held back ahead of tomorrow's release of US employment data.

The yen also looks vulnerable to speculative selling because of relatively low Japanese interest rates, according to dealers. This factor was reinforced when The Bank of Japan said it regards recent moves in the yen as not significant, and that there are no plans to raise its 2.5 pc discount rate.

Stirling's exchange rate index closed unchanged at 75.8. It has already been suggested that bank and building society lending (M4) in August may exceed July's figure of £39bn, and that the trade balance is unlikely to show any dramatic improvement.

The pound fell 65 points to \$1.6940, but rose to DM3.1625 from DM3.1550; to ¥229.75 from ¥227.25; to SF2.67 from SF2.6650. Sterling's exchange rate index closed unchanged at 75.8.

EMS EUROPEAN CURRENCY UNIT RATES

Table with columns for Country, Unit, and Rate. Includes entries for Belgium, France, Germany, Italy, Netherlands, etc.

POUND SPOT - FORWARD AGAINST THE POUND

Table with columns for Term, Spot, and Forward rates. Includes entries for 1 month, 3 months, 6 months, 12 months.

DOLLAR SPOT - FORWARD AGAINST THE DOLLAR

Table with columns for Term, Spot, and Forward rates. Includes entries for 1 month, 3 months, 6 months, 12 months.

EURO-CURRENCY INTEREST RATES

Table with columns for Currency, Term, and Interest Rate. Includes entries for Sterling, US Dollar, etc.

EXCHANGE CROSS RATES

Table with columns for Currency, Rate, and Date. Includes entries for £/\$, £/DM, etc.

LIFFE LAMB GILT FUTURES OPTIONS

Table with columns for Strike, Call, Put, and Settlement. Includes entries for 100, 110, 120, etc.

LIFFE US TREASURY BOND FUTURES OPTIONS

Table with columns for Strike, Call, Put, and Settlement. Includes entries for 100, 110, 120, etc.

LIFFE FT-SE INDEX FUTURES OPTIONS

Table with columns for Strike, Call, Put, and Settlement. Includes entries for 100, 110, 120, etc.

LIFFE EURO DOLLAR OPTIONS

Table with columns for Strike, Call, Put, and Settlement. Includes entries for 100, 110, 120, etc.

LIFFE SHORT STERLING

Table with columns for Strike, Call, Put, and Settlement. Includes entries for 100, 110, 120, etc.

LIFFE EURO DOLLAR

Table with columns for Strike, Call, Put, and Settlement. Includes entries for 100, 110, 120, etc.

LIFFE SHORT STERLING

Table with columns for Strike, Call, Put, and Settlement. Includes entries for 100, 110, 120, etc.

IN NEW YORK

Table with columns for Date, Rate, and Change. Includes entries for £/\$, £/DM, etc.

STERLING INDEX

Table with columns for Date, Index, and Change. Includes entries for 100, 110, 120, etc.

CURRENCY MOVEMENTS

Table with columns for Currency, Rate, and Change. Includes entries for £/\$, £/DM, etc.

OTHER CURRENCIES

Table with columns for Currency, Rate, and Change. Includes entries for £/\$, £/DM, etc.

MONEY MARKETS

UK rates steady

INTEREST RATES in London were little changed on the last day of the month. Some activity was seen in the three and six month interbank, which saw rates edge up a sixteenth of a point on roll-over activity.

The Bank of England forecast a shortage of around £800m, with factors affecting the market including repayment of late assistance and bills maturing in official hands.

The total allocated will be announced today, and traders are hoping for a generous allotment to replace funds drained by continued central bank intervention.

FT LONDON INTERBANK FIXING

Table with columns for Term, Rate, and Offer. Includes entries for 3 months, 6 months, 12 months.

MONEY RATES

Table with columns for Term, Rate, and Offer. Includes entries for 1 month, 3 months, 6 months, 12 months.

LONDON MONEY RATES

Table with columns for Term, Rate, and Offer. Includes entries for 1 month, 3 months, 6 months, 12 months.

EUROPEAN OPTIONS EXCHANGE

Table with columns for Series, Bid, Ask, and Stock. Includes entries for GOLD, EURO, etc.

BASE LENDING RATES

Table with columns for Bank, Rate, and Term. Includes entries for ABN Bank, City Merchants Bank, etc.

Advertisement for Maxwell Communication Corporation plc, featuring a logo and text: 'Maxwell Communication Corporation plc Oxford, England ECU 75,000,000 8 3/8 % Bearer Bonds of 1988/1993'.

OTHER CURRENCIES

Table with columns for Currency, Rate, and Change. Includes entries for £/\$, £/DM, etc.

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FT UNIT TRUST INFORMATION SERVICE

AUTHORISED UNIT TRUSTS

Table listing various unit trusts such as Abbey Unit Trust, Abnott Unit Trust, and Abnott Management Ltd, including their respective managers and details.

Table listing unit trusts such as Acton House, Acton House 2, and Acton House 3, including their managers and details.

Table listing unit trusts such as Acton House 4, Acton House 5, and Acton House 6, including their managers and details.

Table listing unit trusts such as Acton House 7, Acton House 8, and Acton House 9, including their managers and details.

Table listing unit trusts such as Acton House 10, Acton House 11, and Acton House 12, including their managers and details.

Table listing unit trusts such as Acton House 13, Acton House 14, and Acton House 15, including their managers and details.

Table listing unit trusts such as Acton House 16, Acton House 17, and Acton House 18, including their managers and details.

Table listing unit trusts such as Acton House 19, Acton House 20, and Acton House 21, including their managers and details.

I.G. INDEX LTD, 9-11 GROSVENOR GARDENS, LONDON SW1W 0BD. Tel: 01-828 7233/5699 Reuters Code: IGIN, IG10

Prices taken at 5pm and change is from previous close at 9pm. JOTTER PAD

CROSSWORD

Crossword puzzle grid with clues for 1-30. Clues include: 1 Press a switch and get thin! (6), 4 Close by a mean sort of home (8), etc.

Answers to the crossword puzzle: 1 SWITCH, 2 BIRD, 3 BIRD, 4 HOME, 5 BIRD, 6 BIRD, 7 BIRD, 8 BIRD, 9 BIRD, 10 BIRD, 11 BIRD, 12 BIRD, 13 BIRD, 14 BIRD, 15 BIRD, 16 BIRD, 17 BIRD, 18 BIRD, 19 BIRD, 20 BIRD, 21 BIRD, 22 BIRD, 23 BIRD, 24 BIRD, 25 BIRD, 26 BIRD, 27 BIRD, 28 BIRD, 29 BIRD, 30 BIRD.

Table listing unit trusts such as Acton House 22, Acton House 23, and Acton House 24, including their managers and details.

Table listing unit trusts such as Acton House 25, Acton House 26, and Acton House 27, including their managers and details.

Table listing unit trusts such as Acton House 28, Acton House 29, and Acton House 30, including their managers and details.

Table listing unit trusts such as Acton House 31, Acton House 32, and Acton House 33, including their managers and details.

Table listing unit trusts such as Acton House 34, Acton House 35, and Acton House 36, including their managers and details.

GUIDE TO UNIT TRUST PRICING. The data included under the Authorised section of the FT Unit Trust Information Service is intended to provide the service to readers and to conform with new legislation.

Handwritten signature or mark at the bottom of the page.

Handwritten note: "LTD, INC, LTD"

FT UNIT TRUST INFORMATION SERVICE

Main table containing financial data for various unit trusts, including columns for Name, Price, Yield, and other metrics. Includes sub-sections like 'INSURANCES' and 'OTHER UK UNIT TRUSTS'.

INSURANCES

OTHER UK UNIT TRUSTS

FT UNIT TRUST INFORMATION SERVICE

Company Name	Code	Yield (%)	Price	Change	Volume	Company Name	Code	Yield (%)	Price	Change	Volume
Phoenix Assurance Co Ltd	0272-29491	-7.1				Phoenix Assurance Co Ltd	0272-29491	-7.1			
Provident Mutual Life Assn	01-405-0222	-5.1				Provident Mutual Life Assn	01-405-0222	-5.1			
Royal Heritage Life Assurance Ltd	01-499-3334					Royal Heritage Life Assurance Ltd	01-499-3334				
Shield Assurance Ltd	01-567-0718					Shield Assurance Ltd	01-567-0718				
Stanlife Life Assurance Co Ltd	01-623-29421					Stanlife Life Assurance Co Ltd	01-623-29421				
Sun Life of Canada (UK) Ltd	025-90404					Sun Life of Canada (UK) Ltd	025-90404				
Cliffon Financial Management Ltd	0272-29331					Cliffon Financial Management Ltd	0272-29331				
First Financial Services PLC	01-623-29421					First Financial Services PLC	01-623-29421				
The Prudential Group	01-499-3334					The Prudential Group	01-499-3334				
Carters Fund Managers Ltd	01-499-3334					Carters Fund Managers Ltd	01-499-3334				
Wester Hill (L. & P) Ltd	01-499-3334					Wester Hill (L. & P) Ltd	01-499-3334				
Sun Life Unit Assurance Ltd	0272-29331					Sun Life Unit Assurance Ltd	0272-29331				
Investment Portfolio Services Ltd	01-499-3334					Investment Portfolio Services Ltd	01-499-3334				
Johnson Fry Plc	01-499-3334					Johnson Fry Plc	01-499-3334				
Cliffon Financial Management	0272-29331					Cliffon Financial Management	0272-29331				
Swiss Life Partners Ltd	079-09021					Swiss Life Partners Ltd	079-09021				
Target Life Assurance Co Ltd	01-499-3334					Target Life Assurance Co Ltd	01-499-3334				
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FT UNIT TRUST INFORMATION SERVICE

Table of FT Unit Trust Information Service listing various unit trusts with columns for Name, Type, and other details.

LONDON SHARE SERVICE

Table of London Share Service listing British Funds, Foreign Bonds & Rails, and American Stocks with columns for Name, Price, and Yield.

OTHER OFFSHORE FUNDS

Table of Other Offshore Funds listing various offshore investment funds with columns for Name, Type, and other details.

Table of Money Market Trust Funds and Money Market Bank Accounts listing various financial products with columns for Name, Price, and Yield.

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LONDON SHARE SERVICE

LEISURE - Contd

Table of stock prices for Leisure sector including companies like Leisure Group, Leisure Investments, etc.

PAPER, PRINTING, ADVERTISING - Contd

Table of stock prices for Paper, Printing, Advertising sector including companies like Newsprint, Printing, etc.

TEXTILES - Contd

Table of stock prices for Textiles sector including companies like Textiles, etc.

TRUSTS, FINANCE, LAND - Contd

Table of stock prices for Trusts, Finance, Land sector including companies like Trusts, Finance, etc.

OIL AND GAS - Contd

Table of stock prices for Oil and Gas sector including companies like Oil, Gas, etc.

MINES - Contd

Table of stock prices for Mines sector including companies like Mines, etc.

MOTORS, AIRCRAFT TRADES

Table of stock prices for Motors, Aircraft Trades sector including companies like Motors, Aircraft, etc.

PROPERTY

Table of stock prices for Property sector including companies like Property, etc.

TOBACCOS

Table of stock prices for Tobaccos sector including companies like Tobaccos, etc.

TRUSTS, FINANCE, LAND

Table of stock prices for Trusts, Finance, Land sector including companies like Trusts, Finance, etc.

OVERSEAS TRADERS

Table of stock prices for Overseas Traders sector including companies like Overseas Traders, etc.

PLANTATIONS

Table of stock prices for Plantations sector including companies like Plantations, etc.

THIRD MARKET

Table of stock prices for Third Market sector including companies like Third Market, etc.

NEWSPAPERS, PUBLISHERS

Table of stock prices for Newspapers, Publishers sector including companies like Newspapers, Publishers, etc.

SHOES AND LEATHER

Table of stock prices for Shoes and Leather sector including companies like Shoes, Leather, etc.

SOUTH AFRICANS

Table of stock prices for South Africans sector including companies like South Africans, etc.

OIL AND GAS

Table of stock prices for Oil and Gas sector including companies like Oil, Gas, etc.

FINANCE

Table of stock prices for Finance sector including companies like Finance, etc.

REGIONAL & IRISH STOCKS

Table of stock prices for Regional & Irish Stocks sector including companies like Regional, Irish, etc.

PAPER, PRINTING, ADVERTISING

Table of stock prices for Paper, Printing, Advertising sector including companies like Paper, Printing, Advertising, etc.

SHIPPING

Table of stock prices for Shipping sector including companies like Shipping, etc.

TEXTILES

Table of stock prices for Textiles sector including companies like Textiles, etc.

OIL AND GAS

Table of stock prices for Oil and Gas sector including companies like Oil, Gas, etc.

FINANCE

Table of stock prices for Finance sector including companies like Finance, etc.

IRISH

Table of stock prices for Irish sector including companies like Irish, etc.

TRADITIONAL OPTIONS

Table of stock prices for Traditional Options sector including companies like Traditional Options, etc.

A selection of Options traded is given on the London Stock Exchange Report page. This service is available to every company dealt in on Stock Exchanges throughout the United Kingdom for a fee of £949 per annum for each security.

FT-ACTUARIES SHARE INDICES

These indices are the joint compilation of the Financial Times, the Institute of Actuaries and the Faculty of Actuaries

Table with columns: EQUITY GROUPS & SUB-SECTIONS, Wednesday August 31 1988, and Year ago (approx). Lists various industry sectors like CAPITAL GOODS, BUILDING MATERIALS, etc.

FIXED INTEREST

Table with columns: PRICE INDICES, Wed Aug 31, Day's change, and Year ago (approx). Lists various interest-bearing instruments and their performance.

* Flat yield. High and low record, base dates, values and constituent changes are published in Saturday issues. A new list of constituents is available from the Publishers, The Financial Times, Bracken House, Cannon Street, London EC4P 4BY, price 15p, by post 32p.

RISES AND FALLS YESTERDAY

Table showing Rises and Falls Yesterday for various categories: British Funds, Corporations, Industrial and Foreign Bonds, etc.

LONDON RECENT ISSUES

Table listing LONDON RECENT ISSUES with columns: Issue, Amount, Date, and Price.

FIXED INTEREST STOCKS

Table listing FIXED INTEREST STOCKS with columns: Issue, Amount, Date, and Price.

RIGHTS OFFERS

Table listing RIGHTS OFFERS with columns: Issue, Amount, Date, and Price.

TRADITIONAL OPTIONS

Table listing TRADITIONAL OPTIONS with columns: Issue, Amount, Date, and Price.

LONDON TRADED OPTIONS

Large table listing LONDON TRADED OPTIONS with columns: Option, Calls, Puts, and various dates.

AMEV at Half Year

AMEV's profit after tax for the first half year of 1988 amounted to Dfl 134.2m, excluding the realisation of fixed interest investments. The comparable figure for 1987 was Dfl 133.1m. Including realisations the figure was Dfl 134.9m, an increase of 11.0% compared with the same period last year.

Hypobank International S.A. Luxembourg. DM 100,000,000. 5 3/4% Bearer Bonds of 1988/1993. Issue Price: 100 1/2%. Listing: Munich and Frankfurt am Main.

WALES

The Financial Times proposes to publish this survey on: 19th September 1988. For a full editorial synopsis and advertisement details, please contact: CLIVE RADFORD on Bristol (0272) 292565 Fax (0272) 225974

HONG KONG AS A FINANCIAL CENTRE. The Financial Times proposes to publish a Survey on the above on 26TH OCTOBER 1988. For a full editorial synopsis and advertisement details, please contact: PETER HIGHLAND on 01-248-8000 ext 3595 or write to him at: Bracken House, 10 Cannon Street London EC4P 4BY.

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LONDON STOCK EXCHANGE

Rally in equities fails to take hold

AN ATTEMPTED technical rally in the UK equity market ran into the sand in late dealings yesterday as underlying worries about sterling and domestic interest rates reasserted themselves...

to developments in the foreign exchange markets and bond traders have been walking on eggshells since last week's UK trade figures shock. While the bond market now faces a blank period for UK economic data...

69 points in early trading but softened later, slipping away at the close to show a net fall of 1.2 at 1753.6. The mood remained very nervous, with attention still fixed on the foreign exchange and London money markets.

FINANCIAL TIMES STOCK INDICES

Table with columns: Index Name, Aug 31, Aug 30, Aug 26, Aug 25, Aug 24, Aug 23, Year High, 1988 Low, Since Completion. Rows include Government Secs, Fixed Interest, Ordinary, Gold Mines, Ord. Div. Yield, etc.

S.E. ACTIVITY

Table with columns: Index Name, Aug 30, Aug 29, Aug 28, Aug 27. Rows include Gilt Edged Bargains, Equity Bargains, Equity Value, etc.

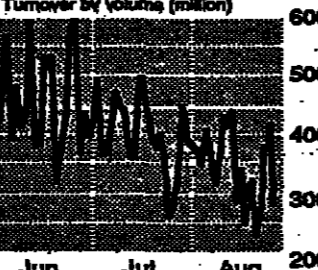
TRADING VOLUME IN MAJOR STOCKS

Table with columns: Stock Name, Volume, Price, Change. Lists various stocks like ASA Group, Anglo PLC, BHP, etc.

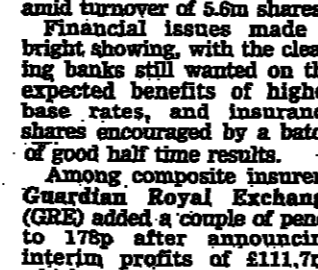
Maxwell hopes to win AGB

AGB RESEARCH saw its shares rise again when it was confirmed that Mr Robert Maxwell's Pergamon Professional Financial Services (PPFS) had made a \$13m bid at 21p...

FT-All-Share Index



Equity shares traded



gent in Turkey. The company will be involved in the distribution of fuels, LPG and lubricants to the Turkish market.

BSR setback

Electronics group BSR tumbled 15 to 66p after the company announced that long-running merger talks with an unnamed party had come to nothing.

Burmah shines

One of the world's largest marketers and producers of lubricants, Burmah Oil, gave a splash of colour to an otherwise drab energy sector.

The High Street retailers

took on a steeper appearance as recent selling pressure abated. However, with the underpinnings of the market still extremely fragile...

Granada attracted more

business than most (2.6m) with the shares nudging a few pence higher to 282p.

Morgan Grenfell favours

Lucas, advising clients to buy "for a major re-rating as adverse sentiment subsides".

including issues such as Lex Service and Lucas Industries

both of which have recently been reviewed favourably. Warburg Securities recommends Lex, saying that "the rating is too low because fears of imminent cyclical peaking in UK automotive retailing and US electronic distribution are overdue".

MEPC revived with a gain

of 9% at 523 1/2p, while Great Portland at 341p, were 5 better. Slough Estates held most of an earlier gain to close 6 dearer at 232p following the interim figures.

Peachey goes Dutch

Peachey Property's days of independence quickly came to an end yesterday as the Dutch property group Wereldhave raised its cash offer for the company from 61p to 65p per share.

NEW HIGHS AND LOWS FOR 1988

Table listing new highs and lows for 1988. Columns include Stock Name, High, Low.

Senior posts at Forward Trust

Mr Graham Picken has been appointed a managing director of FORWARD TRUST GROUPE. In addition to his current responsibilities as director, operations, he has assumed overall control of all the investment financial and leading businesses in the group.

APPOINTMENTS

- Mr Mike Cassworth, formerly marketing and development director of START-RITE SHOES, Norwich, has been appointed joint managing director, sharing the post with the company's chairman, Mr David White.



Mr Paul Brooks (above) has been appointed managing director of PRUDENTIAL VENTURE MANAGERS, part of the Prudential Corporation. The company provides equity finance for providing private companies.

Advertisement for Caisse Centrale de Coopération Economique. Features logo, text: Caisse Centrale de Coopération Economique, FRF 800,000,000, 8 3/4 per cent. Guaranteed Notes due 1993. Includes list of member banks and the name Crédit Lyonnais.

WORLD STOCK MARKETS

Handwritten note: "L'Espresso"

Table of World Stock Markets including sections for Austria, France, Germany, Italy, Japan, and various other regional markets with columns for stock names, prices, and changes.

CANADA

TORONTO

Table of Canadian Stock Markets including Toronto and Montreal sections with columns for stock names, prices, and changes.

Table of Japanese Stock Markets with columns for stock names, prices, and changes.

OVER-THE-COUNTER

Table of Over-the-Counter Stocks with columns for stock names, prices, and changes.

Table of Financial Indices including New York Dow Jones, Australia, Belgium, Germany, Hong Kong, Italy, Japan, Netherlands, Norway, Singapore, South Africa, Spain, Sweden, Switzerland, and World indices.

Advertisement for Financial Times featuring the headline 'Have your F.I. hand delivered...' and '... at no extra charge in Belgium, if you live or work in the following postal districts:'. It lists various postal districts and provides contact information for Brussels (02) 513 2816.

Advertisement for 'Travelling on Business in Italy?' featuring the headline 'Enjoy reading your complimentary copy of the Financial Times when you're staying...' and listing various hotels in Milan, Liege, Leuven, Kortrijk, and Brugge.

Main table of stock prices with columns for stock symbols, last price, change, volume, and other market data.

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NYSE COMPOSITE PRICES

AMEX COMPOSITE PRICES

Table of NYSE Composite Prices listing various stocks with columns for High, Low, and Change.

Table of AMEX Composite Prices listing various stocks with columns for High, Low, and Change.

OVER-THE-COUNTER Nasdaq national market, 3pm prices August 31

Table of Over-the-Counter prices listing various stocks with columns for High, Low, and Change.

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See-saw session ends with slight decline by equities

Wall Street

ACTIVITY in the equities market remained subdued in a fairly narrow range, while bonds at first reacted favourably to the rise in the dollar...

the West German D-Mark since the Bundesbank announced an increase in its discount rate last Thursday. Yesterday it was the turn of the Japanese yen to come under pressure against the dollar...

B F Goodrich rose a smart 2% to \$53 amid rumours that Sir James Goldsmith or Hanson Trust might be preparing a takeover bid. Amdahl slumped 4% to \$40 on the American Stock Exchange...

Frenzied activity is mere memory in Israel

To say the Tel Aviv Stock Exchange is in the doldrums would belittle the travails of those sailors who could often remain becalmed for weeks at a stretch.

MARKET PROFILE



Tel Aviv

having well and truly settled in, there is little sign of investor activity at present in Israel. The market is in trouble, it's dead right now, said Mr David Tobias, securities manager at the Finance and Trade Bank...

If it was not always true. During 1982 the exchange experienced a spectacular frenzy of buying comparable to the South Sea Bubble. In US dollar terms, industry shares rose on average by 15% per cent and insurance companies tripled their market capitalization.

for the minority of shares not in the possession of the controlling family or company. A crippling handicap for the market's growth is the severe restrictions placed by the Government on the allocation of financial institutions' capital.

STOCK MARKET FACT CHART TEL AVIV. Market capitalisation: \$11.02bn (\$12.24bn incl bonds). Top 10 stocks: percentage of market 13.2%.

ASIA PACIFIC

Falling yen drives Nikkei downwards in low volume

Tokyo

A WEAKER yen added further discouragement to equities yesterday, pushing share prices down in this volume, writes Michio Nakamoto in Tokyo. Even the announcement of Nippon Mining's \$1.1bn agreed takeover bid for the US electronic materials group, Gould, had little impact.

Furukawa, an industrial machinery maker and non-ferrous metals company, was the third most heavily traded issue with 19.22m shares exchanged. It rose Y36 to a record high of Y664 in morning trading, but then closed Y10 down at Y618 on profit-taking.

ever, international concern about higher interest rates and rising inflation dominated trading and the index fell. The All Ordinaries index lost 10 to 1,570.5. Total turnover was again light - only 85.48m shares, worth A\$125.0m.

EUROPE

Paris lifted by news on economy and taxes

A LACK of direction characterised trading in Europe yesterday as anxiety over interest rate rises and the strong dollar kept advances to a minimum and volumes low, writes Our Markets Staff. PARIS moved higher throughout the session and ended just off the day's highs but volume remained very thin. The market was buoyed by confirmation from Finance Minister Pierre Bédier that the economy would grow by at least 3 per cent this year...

of the securities repurchase pact tender today all took their toll on sentiment. VW fell DM1.50 to DM246.50 after confirming a 2 per cent rise in first half group profits to DM310m.

London

CONCERN about sterling and interest rates overcame attempts at an early rally in London. The FT-SE 100 index closed 1.2 down at 1,753.6. Although international blue chips were boosted by a firm dollar, the market remained nervous, pending tomorrow's US unemployment figures.

hands. Volume is likely to remain light, say dealers, until the country's general elections on September 18 have passed. The feature of the day was Volvo, which jumped SKR3 to SKR329 as dealers digested Tuesday's profit figures, which at SKR4.8m were well above most analysts' expectations.

buying, rising BFR50 to BFR140 on good turnover. MILAN picked up from an early setback on institutional buying to end slightly lower in better volume than Tuesday's provisional 1.81m. The Comit index fell 4.18 to 519.65. Blue chips were worst hit in the nervous early selling, with Fiat ending L111 down at L2,200, and Generali L360 lower at L21,250. Both recovered after hours. ZURICH saw little excitement and shares moved lower despite a late run as investors went in search of bargains at the lower levels. The Credit Suisse index closed down 1.7 on 468.1.

Roundup

THE DROP in Tokyo unsettled Australia but failed to discourage investors in Singapore or Hong Kong. Manila was in positive frame of mind and Taiwan recovered from its recent depressed trend. AUSTRALIA saw very light trading as dealers looked overseas for inspiration. While foreign markets lacking direction and Tokyo sharply down, how-

ever, international concern about higher interest rates and rising inflation dominated trading and the index fell. The All Ordinaries index lost 10 to 1,570.5. Total turnover was again light - only 85.48m shares, worth A\$125.0m.

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SOUTH AFRICA

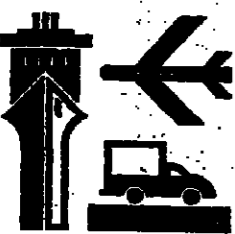
THE ABSENCE of significant news left Johannesburg drifting aimlessly and the market closed little changed. Kloof gained 25 cents to R30.50, while Driefontein eased 25 cents to R31.75.

FT-ACTUARIES WORLD INDICES

Table with columns for NATIONAL AND REGIONAL MARKETS, Wednesday August 31 1988, Tuesday August 30 1988, Dollar Index, 1988 High, 1988 Low, Year ago (approx). Rows include Australia, Austria, Belgium, Canada, Denmark, Finland, France, West Germany, Hong Kong, Ireland, Italy, Japan, Korea, Malaysia, Mexico, Netherlands, New Zealand, Norway, Singapore, South Africa, Spain, Sweden, Switzerland, United Kingdom, USA, Europe, Pacific Basin, Euro-Pacific, North America, Europe Ex-UK, Pacific Ex-Japan, World Ex-US, World Ex-UK, World Ex-USA, World Ex-Japan, The World Index.

Cathay Pacific Airways Limited 1988 Interim Results - Highlights. Results: The unaudited consolidated results of Cathay Pacific Airways Limited for the six months ended 30th June 1988 were: Turnover 6,947.1 HKSM, Operating profit 1,458.2 HKSM, Net operating profit 1,240.0 HKSM, Profit before taxation 1,285.4 HKSM, Profit after taxation 1,020.0 HKSM, Retained profit 763.5 HKSM. Interim dividend: The directors of Cathay Pacific Airways Limited have today declared an interim dividend for 1988 of 9.0¢ per share.

FINANCIAL TIMES SURVEY



The world's aerospace industries are now busier than ever. Rising costs have led to fewer

new civil and military programmes, but production runs are longer and the pattern of international collaboration increasingly complex. Michael Donne reports.

Further rise in spending

THE WORLD'S aerospace companies will congest at next week's Farnborough International Air Show conscious that between now and the end of the century they will enjoy well over \$1,800bn (about £1,000bn) of new business, as aviation in all its forms continues to expand.

Despite defence budget cuts in some countries, military business continues to grow, while there is no end in sight to the growth in commercial aviation, and work on space ventures, despite some setbacks to the US programme and uncertainties over specific projects, such as the UK's *Hotol*, is poised to expand dramatically.

In commercial aviation, it is estimated that spending overall will amount to more than \$700bn. Outlays on new jet transports up to the end of the century or early into the next will amount to some \$414bn, with at least another \$60bn on regional airliners of various types.

Some \$150bn is expected to be spent on new airports and another \$50bn on their equipment, and outlays of some \$50bn to equip the air traffic control system to cope with the rising tide of traffic.

In the military field, it is

estimated that outlays will be around \$755bn, comprising some \$550bn on new military combat aircraft, with another \$150bn on military transports and specialist aircraft (such as tankers and airborne early warning types), and a further \$55bn on helicopters (mostly military).

It is also estimated that at least \$300bn will be spent on guided missiles, primarily for tactical combat use, a figure that may well be conservative.

In addition to all this, possibly another \$200bn will be spent on spacecraft, notably satellites for practical applications, such as communications.

But despite current tendencies to curb budgets, and the problems encountered in the US space programme, spending on developing this new frontier will inevitably increase, covering as it does all facets of mankind's endeavour - technological, economic, political and sociological.

There are many who believe that in the years to come space spending will eventually rival, if not overtake, outlays on commercial and military aviation.

Included in all these figures are engines, accounting for between one quarter and one third of the total (Rolls-Royce



The remarkable Bell-Boeing V-22 Osprey tilt-rotor aircraft makes its maiden flight in Texas this autumn. The Osprey takes off vertically like a helicopter, then its engine/propeller units tilt to the position of a normal aircraft for forward flight. It is expected to have widespread civil and military uses.

AEROSPACE

estimates that demand for commercial jet engines alone may amount to as much as \$200bn by the end of the century, together with a vast array of avionics (airborne electronics) and other systems and equipment of all kinds, probably also amounting together for close to one third of the overall total.

Vast though the business may be, however, winning it is already becoming tougher. In the defence arena, some governments, especially the US, are trimming defence budgets, with in some instances significant changes in procurement policies. The aim is to encourage greater competition for the available business and, it is hoped, achieve better value for money.

This, in turn, is obliging many military manufacturers, again especially in the US, to spend considerably more of their own cash on competitive ventures with which to bid for defence business, with no guarantees of any returns.

A further spin-off from that situation is greater concentration on export sales. The UK's own military production outlook has been significantly improved as a result

of the new Memorandum of Understanding with Saudi Arabia earlier this summer for the long-term provision of a variety of military aircraft and support facilities. The orders could amount in the long term to as much as \$15bn of new business for Britain.

In the commercial field, the vast array of airliner types across the whole range/payload spectrum has generated a fiercely competitive buyers' market among the airlines, which is affecting not only the airframe and engine manufacturers but also financiers.

The latter are themselves becoming increasingly competitive in bidding for the business that is available. The individual performances of airliner types available are often so close that decisions on orders worth billions of dollars can be influenced by the financing terms alone.

To meet this tougher business climate, aerospace manufacturers are working harder than ever to cut costs (especially by streamlining work-

forces at all levels, including management), reduce development times and improve quality by the introduction of new and more cost-effective manufacturing techniques.

Conversely, they are also obliged to increase their research and development budgets to stay ahead in an era of ever-accelerating technological advance.

Apart from this problem of costs, probably the biggest single factor behind the intensification of aerospace competition is that most of the civil and military aircraft and engine types likely to be needed through the remaining years of this century are either already committed to production, under development, or close to being committed.

This in turn means that many of the contracts for engines, avionics, components and systems of all kinds have been, or soon will be, awarded.

Suppliers that have not yet won business on any of those ventures must face the fact that only a limited number of new programmes will now emerge - although each individually may well be a multi-billion dollar venture - and the competition to win some share of the available business will become even tougher. Companies failing to win contracts on those few ventures will face a bleak future.

One result is that many companies in the aerospace industry are establishing joint teams to bid for the contracts on offer.

This is especially so, for example, for major military equipment contracts on the new European Fighter Aircraft, and in the commercial arena on the new generation of Airbus (the A-330 twin-engine high-density jet and A-340 four-engine long-range jet), and the McDonnell Douglas MD-11 long-range tri-jet.

Because of rising development costs, another major trend is the emphasis on derivatives, whereby manufacturers use all their ingenuity to devise improvements in their products to meet increasingly sophisticated airline and military demands, without incurring the expense of entirely new types.

Such derivatives are welcomed because they evolve more directly in response to market needs, and thus meet them more closely, as well as being cheaper to build and to buy.

This situation is seen clearly in commercial aviation, where virtually every major aircraft on offer, from the Boeing 747

long-range Jumbo down to the small 100-seater jets such as the British Aerospace 146, is available in a variety of models.

These, together with the few new airliners now under development, such as the Airbus A-380 and A-340, will continue to satisfy most of the airlines' demands over the next decade or so.

Entirely new airliner ventures are likely to emerge only when radical technological innovations occur, offering sufficiently significant improvements in economic performance to justify both the expense of their development and their high initial purchase prices.

Examples of such possible new ventures include a second-generation supersonic airliner especially for trans-Pacific use; and development of a range of prop-fan powered airliners, starting with the McDonnell Douglas MD-91 100-seater and extending upwards through the entire range/payload spectrum as engine manufacturers expand their involvement in what are called "ultra high by-pass" engines; and possible new types of aircraft emerging from a possible Air-

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bus/McDonnell Douglas link. In the smaller regional airliner field, already a crowded arena, there are possible new developments in jet-powered 40-60-seater aircraft, and in smaller prop-fan types of less than 100 seats. In the military field, derivatives are also playing a major role, mainly in the form of improvements in engines and in avionics (airborne electronics) systems, which can significantly improve aircraft performance without the expense of developing entirely new airframes. Nevertheless, some major new military ventures are planned, such as the European Fighter (EFA), the Advanced Tactical Fighter (ATF) for the US Air Force, and the Advanced Tactical Aircraft (ATA) for the US Navy. One common factor in most if not all of these programmes, actual and potential, is the growth of international collaboration. This has already become well established in the world

Continued on page 12

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AEROSPACE 2

AIR TRANSPORT EXPANSION

Rapid growth in traffic but declining revenue

THE WORLD air transport industry is currently enjoying an unprecedented period of rapid traffic growth, although the benefits are being reduced significantly by declining revenue yields.

According to the International Civil Aviation Organisation (the aviation technical agency of the UN), last year the world's airlines collectively carried just over the passenger on scheduled services, or 9 per cent more than in 1986.

In some regions, and even individual countries, the growth rate was much higher, and all the forecasts are that this growth is likely to continue.

In the first half of this year, the growth rate for scheduled international services by the 171 member-airlines of the International Air Transport Association was 13 per cent, but this is expected to drop back to between 5.5 and 6 per cent a year in 1989.

Even at that level, however, if sustained through the 1990s - which, short of a major economic downturn, most observers expect to be the case - it means that the total number of passengers handled annually will have doubled by the end of this century.

This sustained traffic growth is already generating problems which in turn will become more severe as expansion continues.

One of the most serious of these is the decline in revenue yields, stemming from rising costs against a background of increasing pressures for cheaper fares, in turn stimulated by the intensification of competition.

The latter is itself due largely to the increasing relaxation of Government regulations in such matters as route licensing, market access, capacity controls and fares policies.

IATA is forecasting a provisional operating profit for its member airlines for this year of some \$2.3bn, compared with about \$2.4bn for 1987.

At the same time, the rapid escalation of new technological developments, such as the growth of computer reservations systems and the emergence of CRS "clubs" or groups, is profoundly changing the structure of the airline industry - a development that still has a long way to go.

Meanwhile, the airlines must spend substantial sums re-equipping their fleets both to meet the traffic growth and to replace the growing number of jets which are reaching the end of their useful life.

Looming over all these problems, however, is what the IATA director-general, Dr Gunter Eser, has described as the biggest single problem facing the industry today - the increasingly urgent need to improve the overall infrastructure on the ground and in the air.

On the ground there is a growing need for more passenger terminals and runways, and in some parts of the world even more airports (along with a need for extensive expansion and refurbishment of existing ones), to cope with the growth.

Worldwide, between the end of this century, up to \$150bn will be spent on airports alone.

Much of this will be spent on modernisation and expansion of existing airports, but on present plans close to 100 new airports will either be built, under development or in the planning stage, by the year 2000.

In the air, the increasing volume of flights is already imposing severe strains on air traffic control capacities, especially in the US and Western Europe, as aircraft movements increase.

IATA has forecast that in Europe alone, the number of international scheduled aircraft movements (about 3.5m in 1987) is expected to double to about 6.8m a year by the end of the century.

The IATA says there is already a serious shortage of air traffic control capacity, and that far-reaching improvements to the system are needed.

In the UK alone, some \$900m is to be spent by the mid to late 1990s on improvements to the ATC system - a sum that may well need to be increased if current problems in that area are to be adequately solved.

All these problems are generating for the world air transport industry an unprecedented era of rapid change. Already, the shape and management conduct of the industry is totally different from that of five years ago, and it will have changed even further by the end of this decade.

Apart from the need to improve the industry's fundamental infrastructure, however, probably the most significant development, and certainly the most far-reaching in its long-term impact, is the rapid move away from Government controls towards deregulation and liberalisation.

Within the European Community, a start has been made already with decisions by the Transport Ministers late last year to break the log-jam of government controls which have kept Europe's airlines from the full force of open market competition.

These have included liberalising fares policies, improving market access for airlines, both existing and new ones, and widening the opportunities for airlines to win bigger shares of traffic on any route by changing the current rules on capacity-sharing under bilateral air agreements.

These moves were followed earlier this year by a further EC directive introducing competition in a wide range of air traffic handling and operating techniques at airports.

Welcome though these measures have been to the consumers of air transport - the passengers - they are still widely regarded as not going far enough to ensure total air transport freedom in Europe.

Although the EC itself wants to see complete freedom in the air by the end of 1992, many in the airline industry believe that target to be unrealistic. Even the limited reforms so far achieved have taken years of patient negotiation.

And there is still much reluctance among governments to surrender the national sovereignty over air transport that has been the cornerstone of the industry's development since the early 1930s.

Policing the measures already announced, to ensure their implementation by the airlines, will be a formidable task for the EC, but it will also be under considerable pressure, especially from consumer groups, for further liberalisation measures before the 1992 date.

Another move that is likely to further increase competition and change the structure of the industry is the growth of efforts by governments to privatise their flag airlines either wholly or partially, doubtless

influenced by the highly successful flotation of British Airways in 1987.

There are plans for complete or partial privatisation as far afield as Austria, Canada, the Philippines, Portugal and West Germany, and others will follow. Part of the reason for this is the desire of governments to withdraw from what is becoming a very high cost industry to support, especially with re-equipment costs rising steadily.

But more significantly, it is seen as a recognition that in the rapidly expanding air transport markets of the future airlines will stand a better chance of financial success if they are free to move swiftly to re-equip in changing conditions without the shackles of governmental constraints.

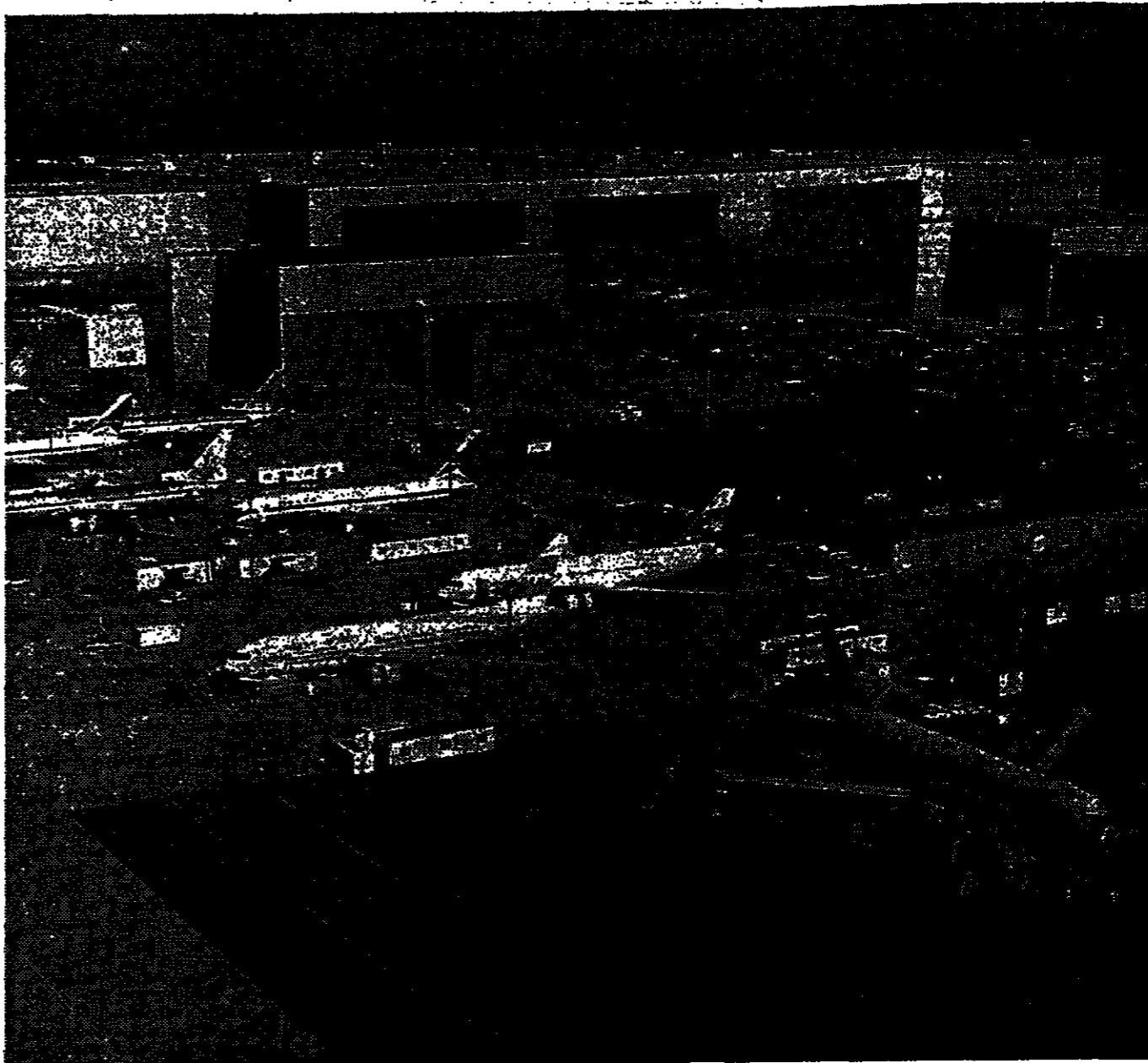
In addition to privatisation, there is also a trend towards closer airline collaboration, either through complete take-overs or mergers (as with British Airways' take-over of British Caledonian), or the purchase of minority shareholdings (as with BA's purchase of a stake in the smaller regional airline, Brynmor), or even through operating pacts to improve the global strength of the participating carriers (such as the BA marketing deal with United of the US).

Further, the bringing together by individual airlines of their computer reservations systems into groups or clubs, such as Amadeus and Galileo in Western Europe, is bound to have a major influence upon the industry's future development.

The over-riding objective in all such moves is to strengthen the carriers concerned, both to enable them to meet the increasingly formidable competition and to increase their individual market shares.

These closer relationships are many and varied, but they are already reshaping the industry - here again the most striking example has been the way in which the BA-BCal merger has resulted not only in an enlargement of BA's own route network but also in new opportunities for other UK airlines to pick up UK domestic and international scheduled service route licences formerly either operated by, or held by, BCal.

Michael Donne



Completed aircraft stand outside the Boeing factory at Everett, north of Seattle, where 747 Jumbos and 757s are built. Boeing's order backlog of over 1,000 aircraft of all types represents more than four years' work at current production rates

CONTROLLING THE AIRSPACE

Air movements to double

OVER THE past summer, air travellers in Western Europe and the US have become accustomed to delays on the ground, some severe, especially in the UK - while the air traffic controllers have struggled to cope with the rapid growth of demand for "slots" in the already densely populated airspace over their countries.

At the same time, in some countries, especially the UK, passengers have been given frequent media reports of "near misses", some of which undeniably have been serious. The two problems have given rise to genuine fears about civil aviation safety at a time of big increases in traffic, averaging more than 10 per cent in the past two years and expected to continue growing at about 6 per cent over the years immediately ahead.

The fact that, so far, there has not been a mid-air collision in the skies over Western Europe indicates that, despite the growth, the air traffic control systems (ATC) are performing well albeit in the face of considerable difficulties.

Moreover, the overall situation, difficult though it may be, has been severely aggravated this past summer by labour disputes in the ATC sectors of various countries - the UK, Spain, Italy and Greece, for example - which at various times have themselves generated unprecedented congestion (with flights delayed by well over 24 hours in some cases) with the inevitable "domino effect" throughout the air transport system.

Whatever the reasons for these industrial disputes, they undeniably have brought misery to many thousands of innocent air travellers, and inflated airlines' bills by many millions of pounds. The long-term damage to air transport is incalculable.

But many of these current problems, including the labour relations problems, have not emerged dramatically overnight. They have been developing for some considerable time, against a background of repeated warnings from many aviation observers.

What has exaggerated them, as the International Air Transport Association (IATA) representative 171 airlines worldwide, has pointed out, is that traffic growth over the past two years has been much greater than anyone anticipated, accelerating the need for improvements in the air traffic control system originally planned for the 1990s.

Nevertheless, no one in air transport minimises the problems. IATA says the shortage of ATC capacity is the most difficult single problem con-

fronting the industry, and fully expects it to get worse.

It points out that the overall volume of 3.5m aircraft movements on international flights in Western Europe (the Euro-control area plus Switzerland and Austria) reported in 1987, which was 7.8 per cent up on 1986, will rise by a further 7 per cent to more than 3.5m movements in 1988, and by a further 4.5 per cent on average each year to reach over 4.6m by 1994.

From those figures, IATA forecasts that the 1987 level of movements will double by the year 2002.

In the UK, many airlines, especially charter operators, who have suffered severe dislocation of their meticulously-

planned operations this past summer, point out that the bills for such dislocation are rising steeply, and that if the situation is not corrected, air fares may have to rise to offset the costs.

Other airlines, including Lufthansa of West Germany, have found that ATC delays are costing them substantial sums.

Much is already being done to improve the situation, but it is essentially a slow process. In the UK, some \$900m is being spent between now and the mid-1990s on improving existing ATC equipment and introducing new facilities, including a totally new and expanded London Air Traffic Control Centre.

The UK National Air Traffic Services, under the Civil Aviation Authority, point out that it is not just a matter of introducing new equipment: training more controllers takes time, and even while improvements are being made in the system, the existing operation has to be run 24 hours a day, seven days a week.

Similar sums are being spent in other countries, although the spending pattern is uneven - hence the labour disputes, often stemming from claims of inadequate equipment, the low pay and status of controllers, and impossible working conditions.

While it is not possible to quantify in detail the total amount that is being spent over the next decade throughout Europe alone on improving ATC systems, it is clearly likely to be several billion dollars.

The UK has also taken the initiative in Eurocontrol, the body set up some years ago to manage the upper airspace over much of Western Europe. It has urged that Eurocontrol should study ways of relieving congestion in the short term, by identifying the incompatibilities between member-coun-

tries' ATC systems and recommending ways of resolving them.

At the same time, it has urged that Eurocontrol should draft specifications for the next generation of ATC systems, and seek additional funds from member-governments. The aim is to produce some kind of progress report by November.

Such actions and outlays will do little or nothing to alleviate the immediate problems of congestion, and whether they will be adequate to solve the problems in the long-term is arguable.

Many controllers, in the UK and elsewhere, argue that current spending plans are nowhere near sufficient to meet the situation. They argue that at a time

posed restrictions on night flights at many airports, the airlines argue that the problem must be faced and overcome, no matter how difficult it may be in individual countries and at individual airports.

This night curfew effectively shuts down most of the air transport industry for seven hours or more every working day, leaving a huge amount of expensive industrial resources idle. The airlines believe that with the increasing number of quieter jets, the severity of such curfews could be alleviated, although it does not advocate their elimination.

A more internationally-based approach to ATC system planning is also needed, with developments covering wider areas of Europe than at present, so that different ATC centres and the equipment they use can be made more compatible than at present.

This particular solution has already been espoused by the aviation Ministers who sit on the presidential commission of Eurocontrol, the body set up some years ago to control the upper airspace over Europe but which may now become a much wider and more powerful organisation governing all European air traffic control systems.

At the same time, the current flow-management system must be much better co-ordinated internationally. At present, say the airlines, it is unresponsive and often causes loss of capacity.

The IATA itself has been studying all these matters in detail through a special Task Force set up in July. This small group, which is due to report by the end of the year, will look into the capacities of airport terminals, aprons, runways and taxi-ways, as well as the immediate air space around airports to see where there are constraints and how they can be removed.

In general, the air transport industry believes that there is no instant and spectacular solution to the current ATC capacity problems.

But it argues that much can be achieved by a wider and deeper international recognition of the problems, and a greater willingness by countries to work together.

Michael Donne

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AEROSPACE 3

AIRLINER MANUFACTURERS

A boom in jet sales

THE WORLD'S major airliner manufacturers are currently enjoying a boom in sales of jet transports of all kinds that seems likely to continue into the early 1990s.

Two factors are causing this demand. First is the confirmed growth of world air traffic, currently running at about five to seven per cent a year and expected to be sustained into the immediate future.

This has already resulted in some big orders so far this year, and if this surge of demand is sustained to the year-end, 1988 may well set a new record for airliner buying, exceeding last year's total of 738 new jets of all kinds ordered, worth over \$30bn.

The demand is spread across the entire airliner range/spectrum, from the short-haul areas where passengers are continuing to insist upon increasing frequencies of service with smaller aircraft, through to the need for increasing numbers of larger medium-to-long range, twin-engine jets for routes where traffic densities do not justify the use of bigger 747 Jumbo-type aircraft.

The latter in turn are also in growing demand, as more and more passengers seek to fly non-stop over longer distances. The second factor is that many of the bigger airlines have now begun the long-awaited replacement of their existing ageing fleets.

This has been delayed for some time because the continued low price of aviation fuel has made it more profitable for many airlines to retain existing fleets of early-model Boeing 747 long-range, 727 medium-range and 737 short-range jets, Lockheed TriStars and McDonnell-Douglas DC-10 medium-to-long range jets, as well as short-range McDonnell Douglas DC-9s and BAC One-Eleven.

But many of these aircraft are now more than 20 years old and are becoming expensive to maintain notwithstanding the low price of fuel, while their noise and pollution emission levels are becoming unacceptable in many countries.

While some efforts are being made to gain extended service lives for some of these older types through ambitious re-engineing programmes with modern quieter and cleaner jet engines - as such as Rolls-Royce Tay engines in One-Elevens - so far the airlines' response has been slow. Big efforts are being made by the companies involved (De Havilland on One-Elevens and Valsen on Boeing 727s, both in the US) to win airline support for these ventures.

But overall demand for new aircraft will remain high. Boeing, the world's biggest builder of jets, estimates that between now and the year 2005, outlays by the airlines on new aircraft will amount to some \$342bn (in

1988 dollars), of which some \$242bn will be to meet growth and the other \$100bn to meet replacements.

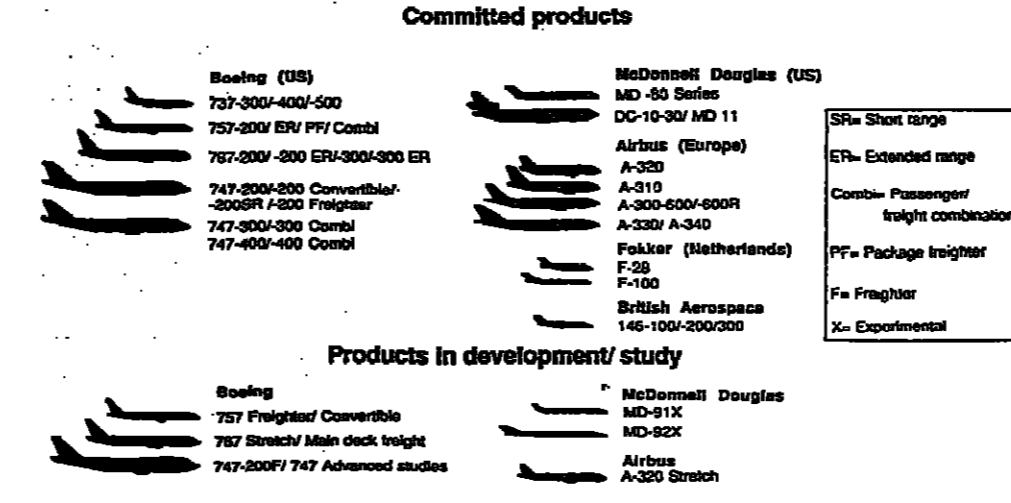
If current orders of \$72bn are included, overall spending by airlines in the Western world up to the year 2005 will amount to \$414bn, compared with the \$372bn spent on jets between 1950 and 1987.

The result will be that, by 2005, the overall world jet transport aircraft fleet will have grown from the end-1987 level of 7,425 to 11,715 aircraft, after allowing for both replacements and traffic growth.

There is already an exceptionally wide range of jet airliners available, covering the entire range-payload spectrum, from 100-seater jets upwards to over 450-seaters, and from short-range jets such as Boeing 737s and McDonnell Douglas MD-80s to very long-range aircraft such as the current Boeing 747-400, the Airbus A-340 and McDonnell Douglas MD-11.

Most of these aircraft are each available in a variety of models. As a result, most of the airlines' requirements can now be met either by fine-tuning the performances of one or another of the different models

Commercial jet airliners



available, or by developing new derivatives to meet new-emerging airline needs.

This "derivatives philosophy" is dictated by the vast costs involved in developing entirely new airliners. Boeing, for example, which until earlier this year hoped to develop

a new 150-plus seater airliner using the revolutionary propfan type of engine, was obliged to drop the plan because of lack of interest among airlines.

It now seems likely that entirely new types of jets will only emerge when major tech-

nological breakthroughs offer sufficiently large performance improvements to justify their heavy development costs.

This could still result in the 1990s in a new generation of ultra fuel-efficient propfan airliners, based on the McDonnell Douglas MD-91 and MD-92 fam-

ily built round the General Electric GE-38 propfan engine or the Pratt & Whitney Allison 578DX, but no formal launch commitments on these aircraft have yet been taken.

Various other major new engine developments are still being studied, such as "ducted fan" or "high by-pass ratio" engines for the larger aircraft.

But while aviation fuel prices remain steady the likelihood of their full-scale development is limited.

In the meantime, one major outstanding question is whether there will be any full-scale collaboration between Airbus and either McDonnell Douglas or Lockheed of the US, in a bid to reduce the domination of Boeing in world markets.

Discussions have been in progress all summer, and Airbus has asked both McDonnell Douglas and Lockheed for firm proposals for such collaboration by October.

The immediate objective is the development of a stretched version of the existing 150-plus seater A-320 to carry 180-200 seats, which is seen as a logical step forward by Airbus.

But other ideas being canvassed include development of a large derivative of the McDonnell Douglas MD-11 tri-jet, using the newly-designed wing of the Airbus A-330/A-430 to produce a long-range high-

density rival to the Boeing 747 Jumbo jet.

Boeing remains calm in the face of such potential opposition. It believes its existing jets, from the 737 short-to-medium-range aircraft, the medium-to-long range 767 twin-engine jet, up to the long-range four-engine 747 - all available in a variety of models - already effectively covers all possible airline needs.

Boeing is now certain to have a new record year for orders in 1988. By early August, the inflow of new orders amounted to 461 aircraft, worth more than \$20bn, matching its previous best year of 1978.

With the further aircraft in negotiation, Boeing believes the final figure for this year could be more than 600.

The company's present backlog of 1,043 aircraft represents over four years' work at current production rates, and Boeing is planning to increase production rates on all its models.

The 737 alone, now the world's best-selling jet with well more than 2,100 ordered so far, is currently built at the rate of 14 a month, but this will rise to 17 a month next year.

Michael Donne

THE ENGINE BUILDERS

Power ratings going up

THE WORLD'S commercial aero-engine manufacturers are likely to remain exceptionally active over the remaining years of this century, not only in fulfilling the big engine orders already on hand for the \$72bn-plus of new airliner contracts outstanding, but also in meeting the massive volume of new business anticipated.

Rolls-Royce of the UK, one of the world's "big three" commercial engine builders (the others are General Electric and Pratt & Whitney, both of the US), estimates that-out of the total \$414bn value of anticipated new airliner orders over the next ten years, the engine makers' share may amount to as much as \$200bn (about \$110bn).

This represents both the value of the initial contracts anticipated, and the value of spare parts over the 20 years or so of service life of the engines involved.

Rolls-Royce believes that well over half of this business is likely to come from the larger airliners of more than 200 seats each, where the "high thrust" engines of 50,000 lbs

thrust and over will be required - such as Boeing 747 and McDonnell Douglas MD-11 long-range jets, and the 767 medium-to-long range and Airbus A-330 short-to-medium range high-density twin-jets.

About one-quarter of the market will be in aircraft of 120 to 200 seats, such as the Airbus A-320 and the Boeing 757, where engines of between 20,000 and 40,000lbs thrust will be required.

The remainder of the business will come in the smaller jet categories of 50-100 seats, such as Fokker 100s and the smaller versions of both the McDonnell Douglas MD-80 and Boeing 737 series and British Aerospace 146, where engines of between 10,000 and 20,000lbs thrust are required.

Other major engine builders sharing this business, apart from GE, Pratt & Whitney and Rolls-Royce, will be CFM International (the consortium formed by General Electric of the US and Saesma of France) to build the highly-successful CFM-56 series of powerplants for the Boeing 737 and Airbus A-320 twin-jets; and Interna-

tional Aero Engines, the seven-company, five-nation consortium (including Rolls-Royce, Pratt & Whitney, Motoren- und Turbinen-Union of West Germany, Fiat Aviazione of Italy and three Japanese engine companies) to build the V-2500 engine for the European A-350 Airbus.

Also involved are Avco Lycoming-Textron, which makes smaller commercial jet engines, such as the ALP-300R for the British Aerospace 146 four-engine regional jet airliner, and Allison Gas Turbine Division of General Motors.

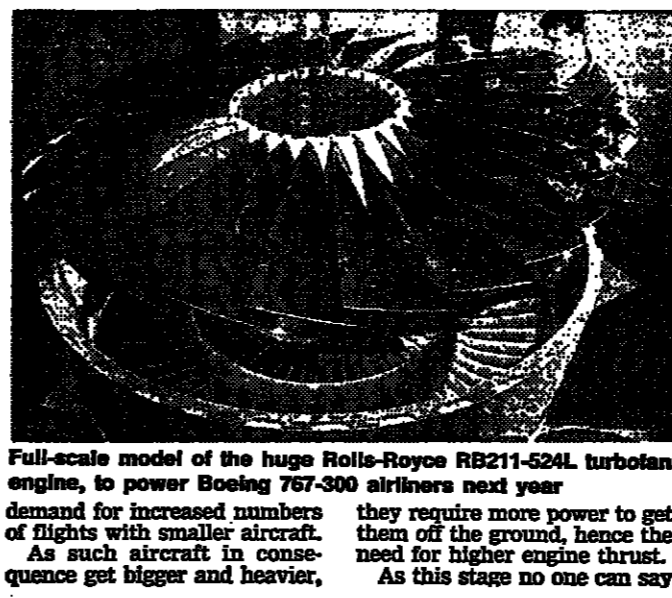
At the top end of the market, for the "high thrust" engines for the biggest and heaviest jet airliners, the three major companies are all now extending the capabilities of their engines - the Rolls-Royce RB-211-524 series, the General Electric

CFE-802C and the Pratt & Whitney 4000.

Their common objective is to push the power of those engines well above the 60,000 lbs thrust level, to meet airline demands for more power for their bigger airliners.

Aircraft for which such engines are needed include the high-density Airbus A-330, the MD-11 and the stretched Boeing 767, with possibly the latest Series 400 Boeing 747 Jumbo also involved.

There are several reasons for this. One is that increasing congestion in the air, especially around major airports, with its consequent problems for air traffic control and restrictions on take-off and landing "slots", is tending to result in the use of bigger aircraft on many short-to-medium range air routes, rather than to follow the basic market



where this trend will end, but as a matter of prudence all of the "big three" engine builders plan to keep pushing their thrust ratings upwards.

At the same time airlines are calling for twin-engine aircraft with greater long-range capability, especially for over-ocean flights, as a means of reducing long-range operating costs on routes where traffic densities do not justify four-engine or even three-engine equipment.

As a result, Rolls-Royce for example is designing capability for well over 75,000 lbs thrust into the latest version of the RB-211-524, the model L, to take account not only of current requirements but also the possible emergence of even higher thrust demands into the future.

These developments in jet engine design, requiring higher thrust to be sustained for longer periods of time, are in turn driving engine manufacturing technology further into the areas of advanced materials, especially to withstand the higher temperatures that higher thrust levels involve.

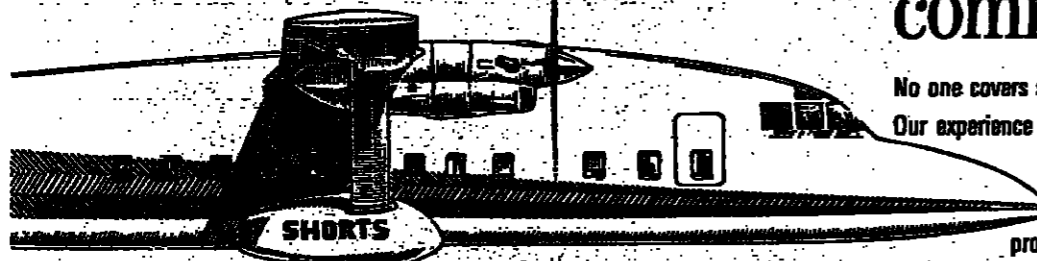
As a result, a wide range of new materials is under investigation, using glass, metals and ceramics as a base, with a variety of reinforcing fibres. Titanium with fibre reinforcement is likely to be used for engine compressors, for example, and ceramics reinforced by ceramic fibres for turbines.

This technology will eventually spin off into other industries. Rolls-Royce believes that as a result of the work being done on new materials such as ceramic composites in the aero-engine industry, a new era in materials for many industries will emerge that might be worth as much as \$300m annually by the year 2000, rising to £2bn a year by 2010.

Another revolutionary development in the aero-engine industry, though still some way off quantity production and service life, is propfan propulsion.

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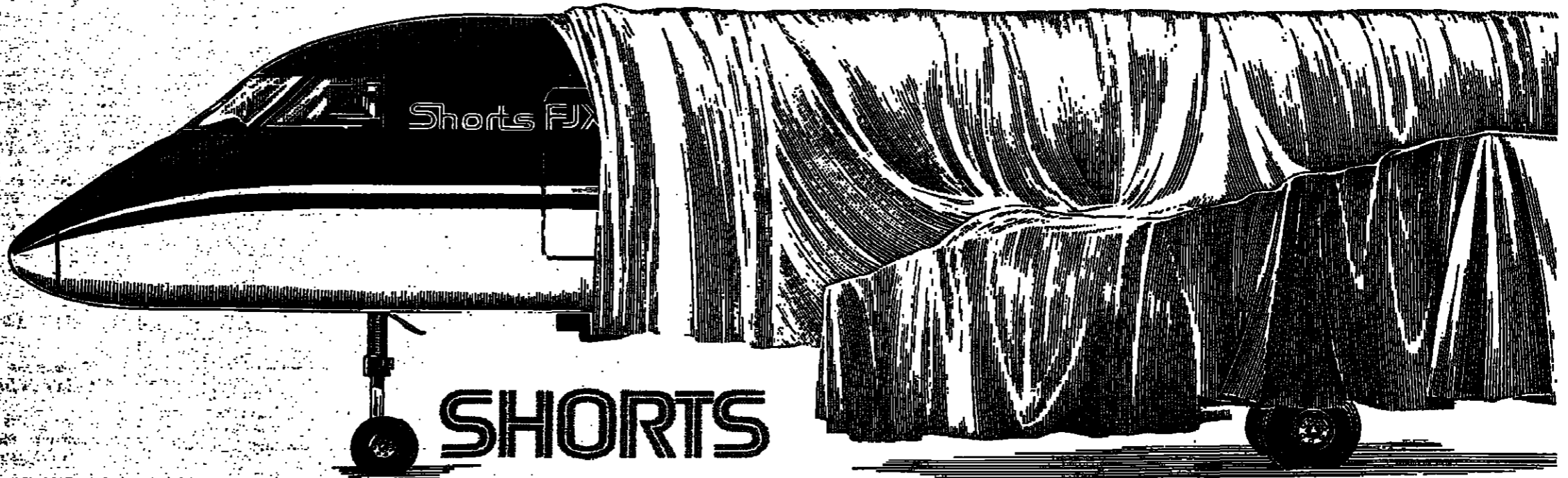
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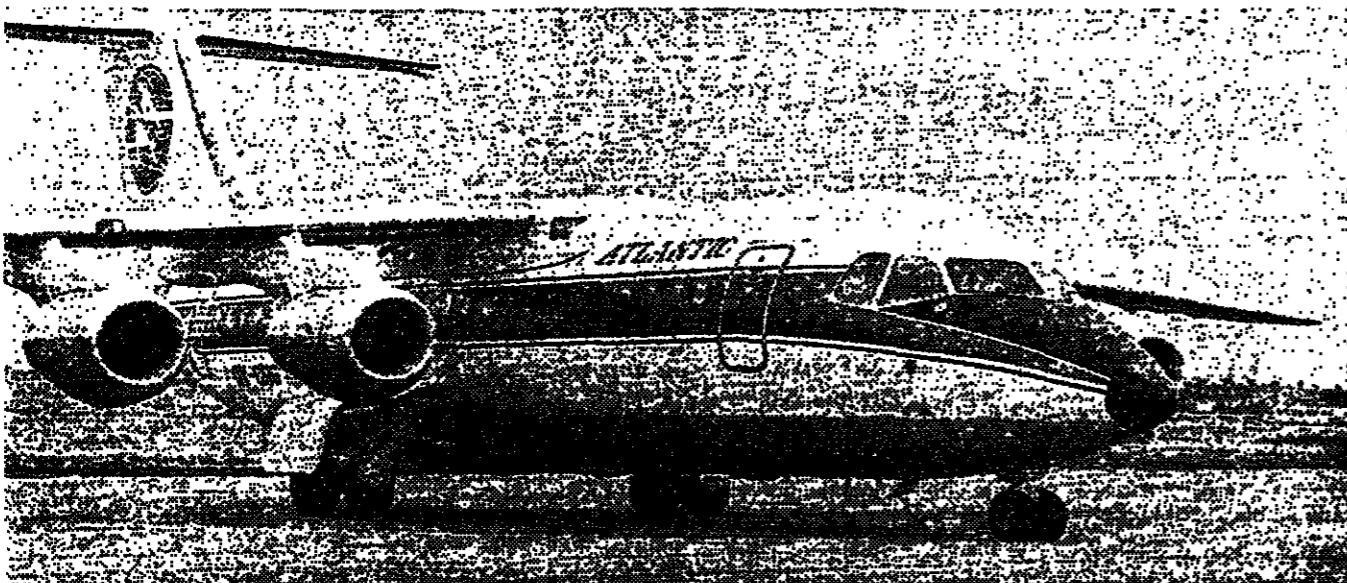
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AEROSPACE 4



BAe 146 of the newly-formed Atlantic Airways, based in the Faroe Islands

REGIONAL AIRLINERS

World market expanding

THE MARKET for smaller types of short-range airliners - the so-called "regional airliners", either jet or turbo-prop powered - is expanding rapidly throughout the world.

20-plus seaters such as the Brazilian Embraer Bandeirante and 30-seat Brasils; the larger Short Brothers' 36-seat Type 360; the 34-seat Saab 340; the 40-plus passenger de Havilland Canada Dash 8 and Franco-Italian Avions de Transport Regional ATR-42; the 50-plus seat Dutch Fokker 50; and the 64-plus seat BAe Advanced Turbo-prop (ATP).



Above: concept sketch of the projected 48-50 seat Canadair Regional Jet, now at the initial planning stage. Below: Saab 340 being operated in Australia by Kendall Airlines from an unpaved strip at King Island, south of Melbourne



This is due partly to the increasing desire of smaller communities to have their own air links with larger centres, but also to the growing demand for direct links between these smaller communities, by-passing the bigger "hubs" where air traffic congestion is already a serious problem.

Development of this type of regional airline operation has been especially rapid in Western Europe, particularly in the EC countries where aviation liberalisation has already resulted in increased freedom for operators.

Market studies by British Aerospace, which builds three types of regional airliner (the 19-seat Jetstream 31 turbo-prop, the bigger 64-plus seat Advanced Turbo-prop and the four-engine 100-plus seat Type 146 jet), indicate that the overall market for the broad category of "regional" types, seating anywhere between 12 to 130 passengers, is in excess of \$25bn (in 1988 dollars) up to the end of this century.

At the same time a market is also emerging for smaller types of jets that lie in size between the corporate aircraft and the Type 146/Fokker 100 - that is, for aircraft of about 48-50 seats.

Already, the regional sector is served by a wide range of aircraft. They include the 19-seat Jetstream 31 of BAe; the

28-seat Embraer Bandeirante; the 30-seat Embraer Brasils; the 34-seat Saab 340; the 40-plus passenger de Havilland Canada Dash 8 and Franco-Italian Avions de Transport Regional ATR-42; the 50-plus seat Dutch Fokker 50; and the 64-plus seat BAe Advanced Turbo-prop (ATP).

jet transport types. Whether either of these new jet projects eventually comes to fruition remains to be seen. The development costs of each are likely to be expensive - not less than \$800m to \$1bn - and it is doubtful whether the ultimate market, large though it may be, could support two such ventures profitably.

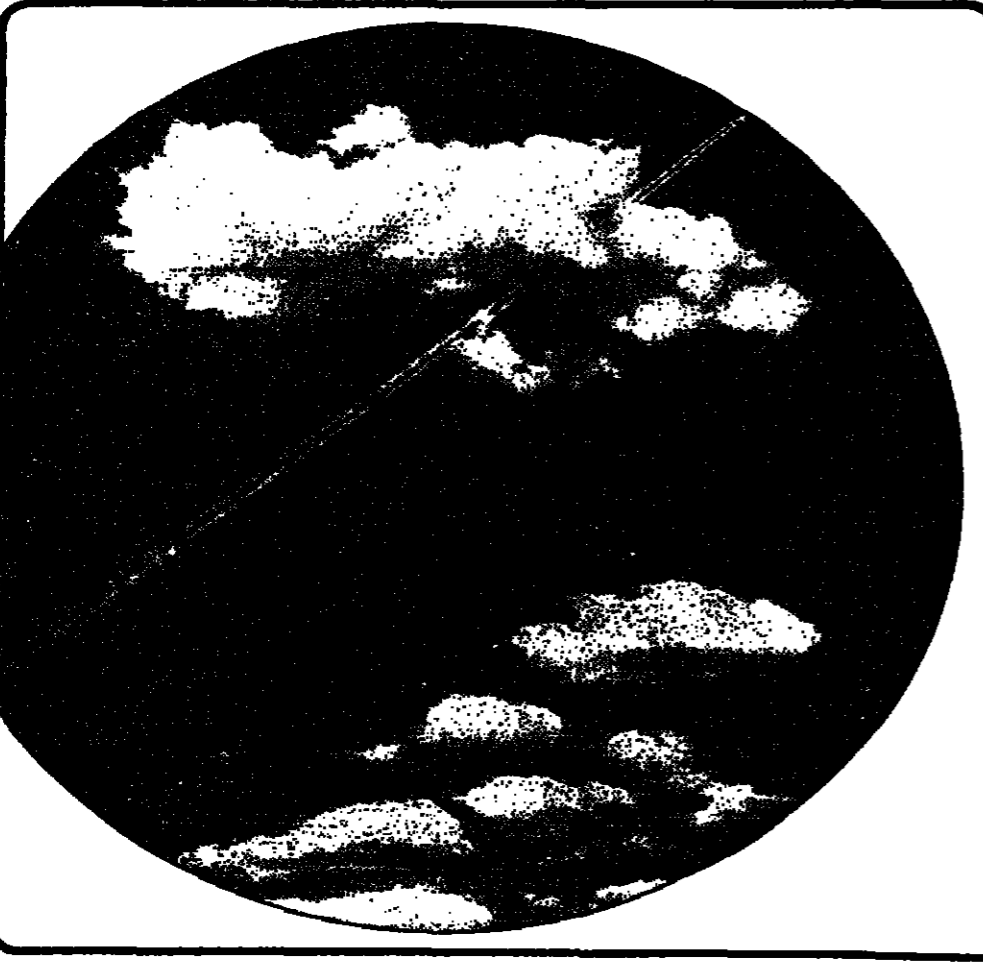
It might therefore make economic sense for both Short Brothers and Canadair to join forces to develop a common aircraft which would be assured of a world market.

In the meantime, Short Brothers is also considering joining a consortium comprising Messerschmitt-Bölkow-Blohm of West Germany and the China Aero-Technology Import and Export Corporation (CATIC) on a slim project called the MPC-75.

The latter, however, is also interested in possible collaboration with Indonesia and Singapore on the development of a 75-seat civil transport, for service by 1995, also based on prop-fan engines which would be developed in Japan.

Both companies hope to win enough launch customers to justify starting full-scale development either later this year or in 1989. In the Short Brothers case, the company is expected to seek UK Government launching aid for the project.

At the same time, however, other studies for regional transports have been abandoned. One, for example, was a plan by Boeing, Messerschmitt-Bölkow-Blohm, Fokker and Nurtanio for a new 100-seat turbo-prop airliner for launch in the 1990s, called ATRA-90 (Advanced Technology Regional Aircraft).



Michael Donne

AIRPORT EXPANSION \$200bn spending planned

AS WORLD air passenger traffic continues to expand last year's total of more than 1bn scheduled passengers worldwide is expected to double by the end of the century and continue expanding thereafter - an estimated \$150bn is expected to be spent around the world on the development of airports and their associated road and rail infrastructures.



Steelwork takes shape for the new £200m terminal building at Stansted, being developed as the third major airport for London. When the terminal is completed in 1991, the airport will be able to handle 7-12m passengers a year

In addition, it is estimated that approaching another \$50bn will be spent on equipping these airports with all the facilities they will require, ranging from baggage handling systems and information boards through to fire stations, runway lighting and other aids, including advanced air traffic control systems to enable them to cope with the surging tide of passenger and cargo traffic.

where air transport is still comparatively at an early stage of its development, and where the authorities have recognised that to be without adequate air transport in the remaining years of this century is to relegate a country to backwater status.

Further growth to some 15m passengers a year, which is considered inevitable, will require Parliamentary approval, probably involving a major debate in the light of virtually certain fierce environmental objections.

Almost every country in the world now has plans for expanding its airport capacity, either through building new airports or expanding and modernising existing ones. But all of them, in one way or another, face constraints from environmental groups which have now become powerful forces ranged against the unbridled development of world air transport.

Further growth, to 25m passengers a year, will require a second terminal building - and involve a major new planning inquiry.

What happens beyond that remains open. BAA (formerly the British Airports Authority) is currently studying future requirements at all its airports to meet traffic growth, and will present a report to the Secretary for Transport some time next year.

There are other difficulties to be faced, including the need to revitalise the air traffic control system, especially by ensuring that there are enough air traffic controllers - a fairly rewarded financially and equipped with adequate modern facilities - to enable them to cope with what is already a serious traffic problem at peak periods but which may well become worse as traffic growth continues into the 1990s.

As a result, expansion within them has to be concentrated on improving and extending existing facilities, as is illustrated by the decision to develop Stansted as the third major airport for London with the provision of a new £300m terminal; the development of a new £200m North Terminal at Gatwick; and the £20m refurbishment of Terminal Three at Heathrow, with suggestions that a fifth terminal may even now be needed at Heathrow.

At the same time, the Civil Aviation Authority is closely studying a wide range of civil aviation issues, including future airport and runway requirements, the need or otherwise for special measures to distribute different types of traffic between different airports, and determining how to improve air traffic control further to cope with growth into the next century.

Solutions to these aspects of the problem lie with governments, which must recognise that air traffic control is the vital "third leg" of the stool on which the whole future of civil aviation rests - the others being the provision of sufficient aircraft and adequate airport terminal and runway facilities.

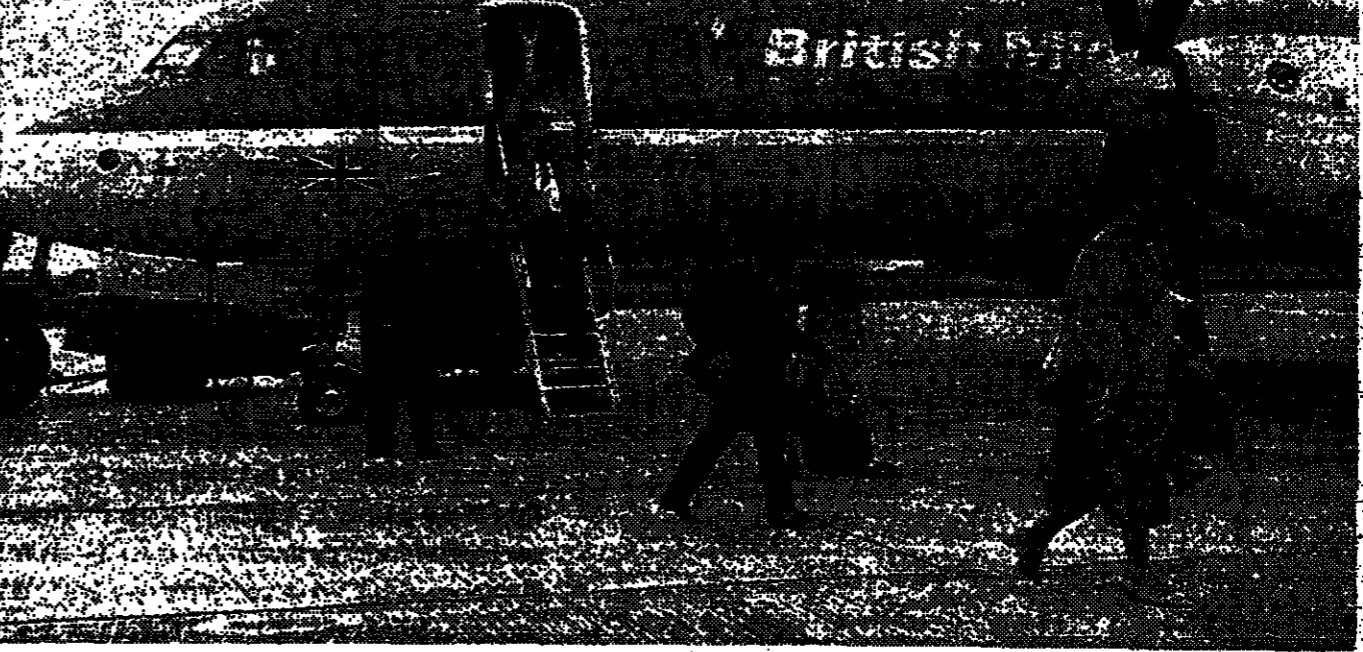
London is one of the few cities in the world to have a city centre airport, the London City Airport in the now rapidly-developing Docklands. This has been operational for under a year and traffic is expanding slowly. At its peak capacity of just over 1m passengers a year, which may be reached around the early to mid-1990s, it could do much to ease the load on the other South East England airports, especially if approval is granted for jet airliners such as the British Aerospace 146 regional aircraft to use the airport.

There is no immediate evidence of an upsurge in firm plans for other city centre airport closures in the world, but the advent of quieter, more environmentally acceptable aircraft would stimulate demand and also help to spread the load on the major airports.

Providing the adequate airport facilities is currently exercising many governments and civil aviation authorities worldwide, and as almost every air traveller readily recognises, there is now hardly an airport anywhere in the world where some kind of modernisation or expansion is not going on.

From last year's 800,000 passengers, the airport is intended to grow initially to cope with between 7m and 8m passengers a year.

Elsewhere in the world, major expansion is taking place at the main airports serving Sydney, Amsterdam, Miami and Singapore, to name only a few of the main projects at present. In addition, most African states have substantial projects, including Gabon, Guinea, Kenya, Mauritania and Nigeria. In Zambia, the Government has been working in association with the Japan Transport Consultants Association on the country's airport expansion plans.



Passenger traffic is expected to continue growing in the 1990s

Engine power ratings going up

Continued from page 3 ever, the propellers are shaped more like ship's screws than conventional propellers, and this together with refinements in the gas-turbines themselves results in substantial reductions of up to 40 per cent in fuel consumption compared with the current turbo-fan (jet) engines.

Moreover, the airlines so far have remained cool to prop-fans. While they recognise that the claims for large reductions in fuel consumption cannot be ignored, the airlines prefer to stay with the types of power plant they know, especially where fuel prices remain at the current comparatively low levels.

It is significant that all the major airlines now on offer to services to 1993.

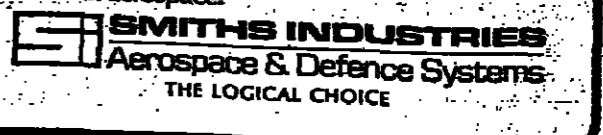
Thus the engine and airframe builders seeking to promote prop-fans, primarily McDonnell Douglas and General Electric, with the MD-91, will have a tough fight to convince customers that they should move into the prop-fan era swiftly.

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AEROSPACE 5

BUSINESS AVIATION

Means to beat congestion

MANY COMMERCIAL and industrial organisations and individual business travellers, especially in Western Europe and North America, have been turning to aviation as a means of improving their communications, thereby expanding their activities and profits.

They have found that by using any of the wide variety of aircraft available to them, either fixed-wing or helicopters, they can overcome the increasing congestion of surface transport. And also - by using the smaller, quieter aircraft that abound throughout both continents - even avoid the increasing congestion at major airports.

Apart from the resulting savings in time, and in wear and tear, there are other benefits in using a private aircraft for business operations, whether it is chartered or owned outright.

One is the much greater privacy gained, for even flying first class or business class on the scheduled airlines is not as conducive to the detailed study of business documents or private business discussions, as private advertisements may claim.

Another is the saving in costs. While at first sight either owning or chartering a private aircraft may appear expensive, closer analysis often

indicates that apart from the savings in regular air fares and even overnight hotel bills, there are tax and other allowances in different countries that make private aviation cheaper than many business people imagine.

Few who have seriously adopted private aviation as a means of promoting their corporate activities ever regret their decision, though a careful investigation of the available options is needed.

In the UK, the General Aviation Manufacturers & Traders' Association (GAMTA), which advises and helps businessmen and women interested in using aircraft, says: "Whether considering purchasing, leasing, or chartering an aircraft, it is essential that the aircraft should match your own specific needs, so far as seating capacity, speed, range, level of comfort and cost are concerned."

The UK's biggest manufacturer of business aircraft is British Aerospace, which earlier this summer sold its 700th Type 125 twin-engine jet. No other British jet aircraft has sold in such numbers, and the aircraft is now in service in 40 countries.

Originally designed as the de Havilland 125, the aircraft first flew in 1962 and has been subject to continuous develop-

ment, resulting in steady improvements in performance, economy and passenger comfort.

Export sales over the years amount to more than £1.5bn in 1988 values. North America is the single largest market for the 125, and accounts for more than 60 per cent of all sales of the aircraft. The 125 now accounts for 53 per cent of the worldwide sales of all types of medium-sized business jets, and the order total is increasing rapidly. During the first six months of this year, sales amounted to 20 aircraft, against 27 for the whole of 1987.

Major recent customers for the 125 have included the US Air Force, which has ordered six aircraft in a \$100m deal to provide aircraft for flight inspection duties.

This deal is likely to help British Aerospace in a major bid for the coming US Air Force contract for a new training aircraft, the Tanker-Transport Training System (TTTS). The USAF is expected to want

upwards of 200 aircraft, worth more than £1.5bn to the chosen manufacturer.

But competition for the deal will be fierce, with all of the major US business jet aircraft manufacturers interested in it, especially Beech and Lear. To help promote its bid, British Aerospace has teamed with Rockwell of the US.

The competition will be fierce because in the US itself the general aviation manufacturing business has been in the doldrums for some time, with demand falling and some manufacturers closing factories, with the result that every item of defence business is bitterly contested.

However, the situation may now be improving, according to Mr Edward W. Stimpson, president of the General Aviation Manufacturers' Association (GAMA).

Learjet and Piper, totalled 551, worth more than \$782m, against 557 worth \$652m in the first half of 1987.

Mr Stimpson suggests that this indicates the industry is now holding its own after the progressive decline of recent years. He points out that the export market is especially strong, with exports accounting for 45 per cent of production in the first quarter alone. Also, the business jet aircraft market in particular remains strong, reflecting the growing appreciation of industry and commerce of the values of business aviation, with first half-year production of 69 business jets against 56 in the comparable period of 1987, a rise of some 23.2 per cent.

Production of turbo-propeller aircraft has remained steady at 120 against 119, but production of single and twin-engine piston aircraft both declined, twins dropping some 14 per cent from 42 aircraft to 36, and single-engine aircraft falling from 340 aircraft to 326.

In the business jet field,

Cessna led the way with deliveries of 28 Citations, worth about \$140m, followed closely by Gulfstream with 23 of the bigger Gulfstream IVs, worth \$337m, while Learjet delivered 11 aircraft, worth \$43.7m, and Beech delivered seven worth about \$207m.

The US industry continues to be deeply concerned, however, about the impact of product liability, where in the event of an accident - even many years after delivery of an aircraft which has passed through several owners, and even where pilots and owners are negligent - the manufacturers can be, and sometimes are, held liable in the courts for heavy financial damages.

As a result, heavy insurance costs to cover such possibilities have pushed up prices and driven sales down. Some manufacturers have even abandoned the production of some models because of product liability costs.

Mr Stimpson commented that "product liability is affecting our competitive position. It

is the single largest cost factor in the production of a piston aircraft.

"Recently, a manufacturer purchased a \$40 part from a supplier and it came with a \$200 surcharge for product liability.

"There is something wrong when a manufacturer is held responsible forever. If the Wright Brothers (of 1903) were still flying they would still be responsible today."

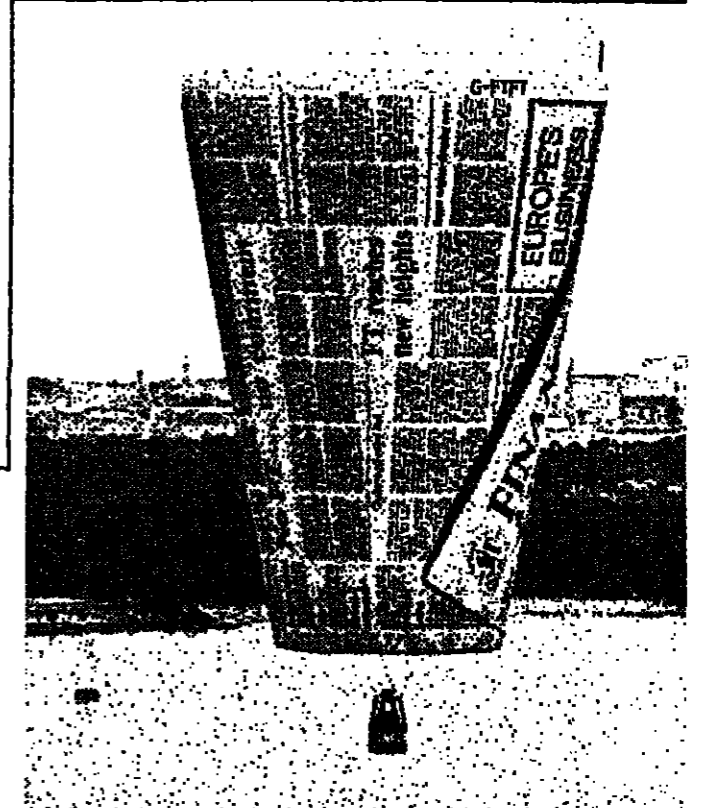
Strong efforts are being made by GAMA to have legislation put through Congress restricting this kind of product liability. Two Bills, one in the

House of Representatives and the other in the Senate, seek to establish uniform product liability standards for general aviation and offer aircraft manufacturers some protection from "frivolous and unjust lawsuits without substantially diminishing the consumers' rights."

GAMA says: "These Bills have moved farther and faster than many would have believed possible earlier this year."

It believes the legislation could be passed this summer if enough pressure is put on Senators and Congressmen.

Michael Donne



THE Financial Times' own aerospace venture, this hot-air balloon was specially built to celebrate the centenary of the newspaper this year. It has been flying frequently throughout Western Europe to advertise the paper.

The balloon is coloured pink and shaped like a rolled-up FT, showing the front page. It was built at Thunder and Colt Balloons in the UK by Per Lindstrand, who achieved the world record height for a hot air balloon of 26,000 metres, and set the transatlantic non-stop record with Richard Branson.

The FT balloon, which can carry three passengers as well as the pilot, is 100 feet tall and has 90,000 cubic feet capacity. Operated for the newspaper by the Aerial Display Company, it made its first free flight at the Biggin Hill Air Show on June 19 and has since flown extensively.

Venues have included Enbaix in France, to celebrate the opening of the FT's new printing plant there, and other cities such as Amsterdam, Copenhagen, Rotterdam, Frankfurt, Geneva, Helsinki, Luxembourg and Stockholm.

Further European flights are planned this autumn, and the balloon may also be taken to the US.

M.D.

AIRSHIPS AND BALLOONS

A growing world demand

remain aloft for many hours at a time. By comparison with fixed-wing and rotary-winged aircraft, they are also quiet and thus unobtrusive - not only a major environmental benefit but also highly useful in many roles.

As a result they are in demand for such work as TV platforms, aerial advertising, sightseeing, and pipeline inspections and other surveillance tasks, as well as many military duties including coastal patrol and over-the-fleet surveillance.

Such craft are being developed in a wide variety of designs to suit the tasks envisaged, with such countries as Australia, Canada, China, France, West Germany, Mexico, and the Soviet Union all involved.

The UK itself now has several helium airship manufacturing companies. Airship Industries, based at Cardington, Bedfordshire; the

Advanced Airship Corporation (formerly Wren Skyships) in the Isle of Man; and Thunder and Colt Balloons.

Airship Industries, an associate of the Australian Bond Corporation, to date has built 13 craft, including both the small six-passenger Skyship 500 and bigger 18-passenger Skyship 600.

Recent sales have included a Skyship 600 to the Tokyo Metropolitan Police for general surveillance work, one craft for use as a TV platform for the Seoul Olympics, and another for sightseeing over Tokyo by Japan Airship Services.

The company is also currently involved in a joint venture with Westinghouse Electric Corporation of the US to develop a \$169m prototype airship for the US Navy.

This craft, called Sentinel 5000, will be more than 400 feet long and is intended to provide a stable platform for Airborne Early Warning of enemy

attacks for the US Fleet while at sea. The US Navy envisages having a large fleet of such craft eventually.

At the same time, Airship Industries is pursuing further export prospects worldwide, with special interest in a US Customs Service requirement for a fleet of up to 12 airships for surveillance; a requirement by the US Coastguard for airships for pollution patrols; and extensive requirements by security organisations for craft for surveillance and other duties.

The Advanced Airship Corporation of the Isle of Man is currently building the ANR (advanced non-rigid) craft at its Jurby Airport base.

This is a 20-30 passenger airship, which is also intended to operate as a maritime patrol craft with an on-station endurance of more than 24 hours. It will cruise at about 40 knots, powered by two Allison (US) turbo-prop engines.



Airship Industries' Skyship 600 over London.

INTEREST in lighter-than-air craft of all kinds is growing rapidly worldwide. These include both hot-air balloons for advertising and display, as well as leisure and sport flying, and powered, passenger-carrying airships which are helium-filled.

Hot-air balloons are built in the UK by two major companies, Cameron Balloons, of Bristol, and Thunder and Colt of Oswestry, Shropshire. Between them the two compa-

nies build and export about 500 hot-air balloons of various designs a year.

By their nature, hot-air balloons, which are non-powered and non-steerable, are more suitable for advertising and display and leisure flying purposes, while airships, which are powered and steerable, can be used for a wider range of work.

This includes tasks requiring a craft able to fly slowly with a high degree of stability, and to

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AEROSPACE 6

Commercial involvement in space programmes is increasing
Private sector moving in

THE WORLD'S space industry over the next few years looks likely to settle down to a period of steady but by no means rapid growth as some of the uncertainties inherent in the business start to become smoothed out. The sector is passing through a consolidation phase between the initial headlong rush into space projects and a further stage in which schemes of this kind begin to produce significant economic returns. Space programmes, according to this argument, were started initially at the behest of governments to provide both military security and a sense of spiritual achievement that voyaging into the cosmos involves. The early rocket launches were vital for putting into orbit spy satellites and other military hardware considered to be vital for defence purposes. At the same time, the advent of manned space flight, in the shape of Yuri Gagarin's epic voyage in 1961, led to a battle for political prestige played out between the US and the Soviet Union. Today, space programmes are still very much affected by the twin factors of military involvement and prestige, but with commercial and technological aspects playing a stronger part. Virtually all space projects rely on state organisations if not to foot the total bill then to provide vital infrastructure such as the provision of launch facilities. There has, however, been an increasing interest by the private sector in taking part in space programmes for commercial reasons. Privately-backed telecommunications companies, for example, are involved in many of today's communications satellite projects. This is particularly the case in the US, where companies such as GTE and Western Union have been accepted as purchasers and operators of these vehicles since the 1970s. The trend has spread in recent years to Western Europe - as is manifested by the plans of Société Européenne des Satellites and British Satellite Broadcasting, two private European organisations, to start rival direct broadcasting TV satellite services in the next two years.

Private sector involvement is also increasing in the area of launcher systems. Here Ariane, a French company with a mixture of private and public shareholders, is battling with three US aerospace companies, McDonnell Douglas, Martin Marietta and General Dynamics, for the biggest share of the market for launcher services for non-military satellites. This market, likely to account for the launch of about 15 satellites a year and to add up to some \$800m annually, looks likely to grow at a reasonable rate - though far less quickly than was envisaged a decade ago. In a move that should boost strongly the private sector's involvement in launchers, the US Government is leaving the business of putting commercial satellites into space. The space shuttle fleet, which should be flying again by the end of the year after a gap in missions of nearly three years following the Challenger disaster in January 1986, will be reserved from now on solely for launching military and other government payloads. Another increasingly important factor is a greater understanding of how space programmes can promote technological innovation in terrestrial industries. The view of how this promotion comes about is somewhat more sophisticated than in the early days of spaceflight when space projects were said, sometimes incorrectly, to be responsible for many pioneering technological achievements from microchips to hospital equipment. It is now more generally understood that space programmes can play a part in training significant quantities of engineers and scientists in important technologies involving areas such as electronics, mechanical engineering and materials. These people may have a wider impact not only through interacting with outside bodies such as companies engaged for subcontract work and university teams which help out on specialist research projects, but also by eventually leaving their jobs to work elsewhere. According to this view of space schemes, the world's biggest space companies such as specialist research projects in West Germany Aerospace and France and Hughes Aircraft, Martin Marietta and Rockwell of the US are playing a big part by a series of subtle networking effects in driving technological changes through their countries' engineering communities. Most of the \$800m or so a year spent on space projects in Western Europe, the US, and Japan on space projects is paid for, despite the interest by the private sector in some of these schemes, by governments. This is partly because of the high level of military involvement - some two thirds of the US's \$28bn a year space budget comes from the Defense Department with the rest paid by the civilian National Aeronautics and Space Administration. Another factor is the generally-held belief that only governments are in a position to take the long view of the importance of space operations that is needed if these activities are to be financed. According to this argument, private companies are interested in backing projects, whether they be on the ground or 300 miles above it, only if they can see the possibility of commercial returns within a decade or so. For many space projects - the International Space Station being discussed for the next decade is a case in point - economic benefits are likely to be realised only on a much longer timescale, if at all. Hence, it is argued, the need to involve government planning and finance in many space ventures, and in particular the space station - which is expected to cost \$20bn-\$30bn and involve the US, Western Europe, Japan and Canada. This view has failed to strike a chord in the UK Government which, over the past year, has caused a stir in Western Europe by refusing to show any enthusiasm for a series of ambitious space schemes organised by the 13-nation European Space Agency. These projects, likely to cost about \$13bn by the end of the century, involve construction of the Columbus manned space laboratory (the European contribution to the space station), a new form of Ariane launcher, and the French-inspired Hermes space shuttle.

While Britain at the last minute decided to opt for a minor involvement in Columbus where it will provide 8.5 per cent of the project's cost of about \$4bn - it is not putting up any money for the other two schemes. The UK has conveyed its view on this issue with some tactfully, much of it stemming from the involvement in the debate of Mr Kenneth Clarke, the former UK Minister for Trade and Industry, who recently left this job in a government reshuffle to become Minister for Health. It is surprising, given the strength of the official UK views on the issue, that virtually all the other nations with any expertise in this sector go along with the consensus opinion that government involvement is essential. For example, most observers believe it impossible that whoever wins the US presidency in the autumn would fail to back a strong and determined US space programme with a large element of federal funding. Peter Marsh

THE POSSIBILITY of developing a second-generation supersonic airliner to replace Concorde either late this century or early in the next is now attracting increasing attention, especially in the US.

At the same time, work now under way in the US on what are called "Transatlantic vehicles" (TAVs) or "aerospace planes" - vehicles that can use existing airfields, soar into earth orbit, and land again like conventional aircraft - is spearheading advances in aerospace technology that could be relevant to supersonic or hypersonic transports. As a result, interest in second-generation supersonic airliners is quickening. Aerospace itself, one of the original partners in Concorde, has undertaken studies for such an aircraft, but has so far got little further than conceptual design. In the US, the National Aeronautics and Space Administration has promoted aerospace industry studies to establish the most suitable parameters of any eventual second-generation supersonic airliner, which it calls broadly the High Speed Civil Transport, or HSCT.

The two major manufacturers, Boeing and McDonnell Douglas, have already submitted preliminary reports. After studying them, Nasa must decide its next step - either to pursue the research, or drop it. Boeing's view is that the least expensive aircraft to develop would be similar to Concorde in design, with a top speed of about Mach 2.2 (just over twice the speed of sound or about 1,200mph), using existing types of aviation fuel

but carrying a much larger payload - 200 to 300 passengers against Concorde's 100. The company argues that the technical problems of developing a faster aircraft would lead to higher costs, without offering any significant benefits since much of the time saved in higher cruising speeds would be lost in climbing and descending at sub-sonic speeds. McDonnell Douglas, however, prefers a faster aircraft, capable of five times the speed of sound (Mach 5 or about 3,500 mph) over trans-Pacific distances, from, say, New York to Tokyo and Beijing, San Francisco-Hong Kong and Los Angeles-Sydney. Mr Don Graf, Douglas Aircraft's advanced projects manager, believes that by early next century there could be a market for more than 1,000 second-generation HSCTs, provided that such problems as financing and the sonic boom can be overcome. The sonic boom problem perhaps could be overcome by flying much higher than the 60,000 feet of Concorde, but it could still be a problem at inland airports, so that supersonic speeds could be reached only over the oceans. Financing also remains particularly acute. No single company could afford the \$10bn-plus that such an aircraft would involve. The US aerospace industry as a whole might be able to undertake the venture technologically on a joint industry-wide basis, but would certainly need extensive Government cash support. Moreover, the US Government would probably insist on international collaboration to reduce the bill and widen the potential market. Likely participants would be the UK and French industries, the original Concorde producers, possibly together with Japan which would have a strong interest in such an aircraft because of Japan's strategic Far East location.

So far, there are few signs of any such collaboration emerging. Although Nasa is encouraging the research, it does not have the budget to fund any full-scale venture, and would have to obtain Government cash to pursue such a development, even with industry support. Western Europe, the major manufacturers, such as British Aerospace and Aerospaciale, are interested, but have no money, and stress that any HSCT would have to be government financed. But no European government with experience of Concorde's financial, technological and sociological development difficulties in mind, is so far prepared to support such a venture. Before governments can be persuaded even to consider any HSCT, the aerospace industries in various countries will have to sharpen their collective approach. They will need to undertake extensive research, produce highly-detailed analyses of development and production costs, and whip up the currently dormant or non-existent interest among the airlines. It might be easier to wait for any second-generation supersonic or hypersonic airliner to evolve as part of the spin-off from the current efforts in the US to develop the technologically more advanced earth-orbit "Trans-atmospheric vehicles" (TAVs), or "aerospace planes".

HYPERSONIC FLIGHT

Stepping beyond Concorde

Although designed for more advanced roles than any second-generation HSCT, these aircraft will spawn all the major advances in power plant and other technologies that any HSCT might require. In the US, the National Aeronautics and Space Administration is already under way, providing for unmanned development models to fly in 1993. This is to lead to a full-scale manned vehicle later in the decade, initially for military space missions but eventually also for commercial space ventures. Similar plans for such vehicles have been studied in the UK - the Horizontal Take-off and Landing (Hotol) project by British Aerospace and Rolls-Royce, and in Western Germany the Saenger concept. But the UK Government has said it does not intend to support the Hotol venture further financially, and it is now up to British Aerospace and Rolls-Royce to win support for the idea elsewhere. The most likely way ahead for this venture in Western Europe would now appear to be through the European Space Agency, which itself is interested in the long-term possibilities of such earth-to-orbit vehicles. But so far, even the ESA is dependent on governments for financial support. In the US, however, work is being pushed ahead under the Nasp programme, and case the validity of all the advanced technologies in metallurgy, ceramics and other materials, and in fuels and on-board systems has been demonstrated, the potential spin-off for the development of second-generation HSCTs seems likely to become much clearer. Michael Donne

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NEW MATERIALS

Advanced lessons in Hotol

HOTOL, for space enthusiasts, is the space plane that could put Britain in the vanguard of cut-price satellite launching sometime early in the next century. But for realists in the British aerospace industry it has a more down-to-earth role. It is a test-bed which could help to pull through much advanced materials technology and associated manufacture, in readiness for new generations of military and civil aircraft. Hotol is a hydrogen-fuelled rocket which burns air for the first few minutes of flight to minimise the amount of liquid oxygen it needs to carry. To do this some difficult engineering problems must be solved that arise with an atmospheric oxygen intake that grows thinner and colder as Hotol increases in altitude, but hotter as it accelerates. Rolls-Royce, which has acquired the patents from the inventor, Mr Alan Bond, and has designated the engine RB-545, says it has never considered the engine as anything but a propulsion system for space launches. Nevertheless, the engine technology will advance its experience of high-speed propulsion in the regime Mach 2 to Mach 8. But operating temperatures envisaged for the RB-545 are little different from those it expects to meet in military engines in the next 20 years. Rolls-Royce engineers believe bigger advances in materials technology will be demanded of the aircraft engineers, who must seek to minimise the weight. Hotol, although expected to improve on the poor payload-to-weight ratio of current satellite launchers, with only about 1 per cent of their launch weight as payload, is still rated at best only at 3-3.5 per cent. It is expected to take the best end-users of the material technology of British Aerospace to achieve such a figure - still only half what Concorde achieves. To achieve the target payload-to-weight ratio, much of the Hotol is expected to be made of advanced materials, either carbon-fibre composites or metal matrix composites, with nickel alloys needed to withstand temperatures exceeding 1,700 deg. C expected to be found in the engine. "In an engineering company, the main concern is the acquisition of sufficient knowledge about the materials to enable the designer to form them into artifacts with high confidence in the ultimate performance," says Dr Robin McEwan, head of materials science research at BAE's Sowerby Research Centre, near Bristol. Dr McEwan says his company has responded to reductions in the R&D effort on new materials by the defence research establishments in Britain, by establishing Sowerby as a corporate research laboratory "to address long-term basic issues in materials and other research." BAE is a big customer for advanced materials, spending about \$100m a year on top-quality materials, including

which has spotted a niche in the aerospace market for reinforced thermoplastics is Sintermark, with its uncrushable tubes made from braided fibres of carbon, Kevlar or glass. Its process combines time-honoured textile practice with polymer science to make small-bore tubing for aircraft cooling ducts - lighter than aluminium ducts and more easily installed, the company claims. The material also resists stopped Coca-Cola, which can wreak corrosive havoc with aluminium fittings in aircraft galleys. Dr Bob Jeal, chief of materials and mechanical technology at Rolls-Royce, forecasts that military demands will lead to an engine built largely of non-metallic materials by the year 2010. He suggests that nearly 60 per cent of the engine would consist of two types of ceramic composite - either MMC or ceramic-matrix composites (CMC). "Continuing development of metal alloys cannot provide the properties needed for the major performance advances required beyond the year 2000," Dr Jeal says. He believes changes in design, materials and manufacturing technology will all be required to make the next leap ahead in performance. His targets include a thrust-to-weight ratio of 30, and a reduction in mission fuel burn, in first cost, and in maintenance. Unfortunately, they are also brittle, sensitive to flaws and hence unreliable. "The plastic flow which occurs with ductile materials is not possible," Dr Jeal acknowledges. Nevertheless, he is sufficiently confident that these disadvantages can be circumvented to forecast that the military jet engine of 2010 will have a composite compressor and a ceramic turbine. It will be, in effect, a non-metal engine. David Fishlock

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AEROSPACE 7

Military spending will remain high into the next century
Eurofighter sustains jobs

DESPITE GROWING pressures to cut defence budgets in the Western world, it seems likely that spending on military aircraft will remain high throughout the remaining years of this century.

One estimate, prepared by British Aerospace, is that between now and the year 2010, some 22,000 combat and jet trainer aircraft will be delivered, worth (at today's prices) about \$550bn.

Nearly 9,000 of these are already committed, either for existing orders, or through plans for such major "next generation" programmes as the European Fighter Aircraft (EFA), and the Advanced Tactical Fighter (ATF) for the US Air Force and the Advanced Tactical Aircraft (ATA) for the US Navy.

Over the same timescale, it is estimated that some 3,200 military transport aircraft of various types will be needed, about half of them in the C-130 Lockheed Hercules size bracket - for that four turbo-prop engine aircraft has been one

of the great success stories in military transport production, with more than 2,000 sold and production continuing even while the search for a suitable replacement has yet to reach a conclusion.

This demand for transports (including special-purpose types such as Airborne Early Warning Aircraft, anti-submarine warfare aircraft and tankers) is likely to amount to an additional \$150bn at today's prices. As a result, total military aircraft spending seems likely to amount to some \$700bn up to the year 2010.

It is estimated that the current world inventory of combat and jet trainer aircraft stands at about 28,000 aircraft. Most of the first generation of post-war jet fighters have now been phased out, and many of those aircraft now in service are jet fighters of later vintage.

But many of these will need to be replaced over the next decade or so, not so much because they are ageing - indeed, many of them still have considerable service lives ahead - but because they have been overtaken by the

development of avionics and engine technologies and are thus no longer suitable for frontline service with the super powers.

However, many of them can, and will, find uses in supporting roles or in the air forces of smaller countries. At the same time, there is a diverging trend in military aircraft design. At the top end of the scale are the costly and complex highly advanced supersonic air-superiority fighters (such as the ATF and the ATA mentioned above). There will be comparatively few individual types of such aircraft developed in the remaining years of this century, because of their vast costs, but the production runs in each case are likely to be substantial.

Beneath those aircraft, however, there is an expanding market for smaller, cheaper and less sophisticated light

combat aircraft - the British Aerospace Hawk 200 is a classic example - for battlefield support in particular, and it seems likely that much of the estimated spending of \$550bn will be on this type of aircraft.

In Western Europe, the long-running Tornado remains a major programme, with several years of quantity production to run. Although 809 aircraft were originally ordered, subsequent additional orders for both export and to meet increased requirements from the UK, West Germany and Italy have already increased the total to 933, and further contracts in negotiation seem likely to eventually lift Tornado production to well over 1,000 aircraft.

One major new order in prospect is that for additional Tornados for Saudi Arabia, under the major defence procurement Memorandum of Understanding signed with that country in

early July. Saudi Arabia is already buying 72 Tornados in an earlier defence deal. It was also revealed earlier this summer that the Nato management agency running the Tornado programme on behalf of the member-governments had asked Panavia, the prime manufacturer on the programme, to quote for a further batch of 100 Tornado aircraft, comprising 25 Interdictor Strike (DS) models and 75 Air Defence Variants (ADVs) for the RAF, 35 DS for the Luftwaffe, 16 electronic combat and reconnaissance (ECR) variants for the Italian Air Force and eight DS for the Royal Jordanian Air Force.

The most significant military aircraft development on this side of the Atlantic in recent months, however, has been the formal go-ahead for full-scale development of the European Fighter Aircraft (EFA or Eurofighter) by the Governments of

the UK, West Germany, Italy and Spain. This plan to build more than 300 aircraft, worth in all over \$20bn, will keep the aerospace industries of all four countries fully employed through into the next century. Eurofighter, and its associated EJ-200 engine, will gradually replace current Tornado work as the latter runs down.

Work on the Eurofighter programme is under the management of Eurofighter Jagdflugzeug, based in Munich, set up by Messerschmitt-Bölkow-Blohm, British Aerospace, Aeritalia of Italy and Construcciones Aeronauticas SA (CASA) of Spain.

The EJ-200 engine for the aircraft is being built by Eurojet-Turbo, set up by Rolls-Royce, Motoren und Turbinen-Union (MTU), Fiat Aviazione of Italy and Sener Ingenieria y Sistemas of Spain. The development programme

of the Eurofighter will centre on the construction and flight-testing of eight prototypes, including two trainer versions. A further two airframes will be built for ground tests.

Each nation will build at least one prototype to gather experience of final assembly before going into full production. The British Aerospace built EAP (Experimental Aircraft Programme) advanced technology demonstrator aircraft, which first flew in 1986, will be used as a "flying test rig" to support EFA development.

The EFA is due to enter service in 1995. Development costs will be shared 23 per cent each by Britain and West Germany, 21 per cent by Italy and 13 per cent by Spain.

The French rival to the Eurofighter, the French Dassault Rafale, has won a French Government contract for five prototypes, three for the Air Force and two for the Navy, with the first due to fly in early 1991. But Dassault has not yet won any international partners, although it has offered Belgium a 10 per cent share in the development programme.

and is also wooing Spain. The Rafale will be flying at the Farnborough Air Show. Possible new ventures in military aircraft for the future beyond the EFA include super-sonic derivatives of the existing Harrier vertical take-off and landing fighter (Vtol).

Rolls-Royce, British Aerospace and McDonnell Douglas of the US have been studying both the possible airframe designs and engine types that might be suitable for such an aircraft, but so far no firm decisions to go ahead with such a venture have been taken.

However, such a development from the Harrier stable could face a competitor from elsewhere in the US industry. Lockheed has disclosed that under the first phase of a two-phase contract from the National Aeronautics and Space Administration, the Lockheed Aeronautical Systems Company (LASC) is developing a conceptual design for a supersonic short take-off and vertical landing (STOVL) fighter for the year 2001.

Michael Donne

TILT-ROTOR FLIGHT

All eyes on Osprey

ONE OF the most significant maiden flights in aviation history is expected to take place this autumn at Fort Worth, Texas, when the world's first production "tilt-rotor" aircraft leaves the runway.

This unique aircraft, called the V-22 Osprey, is under full-scale development by Bell Helicopter Textron of Fort Worth, and Boeing Helicopters of Philadelphia, for the US armed forces, under a \$1.5bn contract. Six prototypes will be built, but eventually nearly 1,200 V-22s are expected to be used by all the US armed forces.

The aircraft has two Allison T-406 turbo-shaft engines, each with a large rotor, mounted at the end of each of its stub wings. The engine/rotor units can be tilted (with the wings remaining stationary) to allow vertical take-off and landing like a helicopter; but once the aircraft is airborne they are tilted to the conventional propeller position for forward flight.

The result is an aircraft of exceptional operational flexibility, capable of combining the vertical take-off and low speed characteristics of helicopters with the speed - up to more than 360 mph - of a turbo-prop aircraft. The range on full payload will be over 500 nautical miles.

With such a performance, it is claimed that the Osprey can fulfill a wide variety of military requirements as well as civil aviation needs. For exam-

ple, it will be an answer to the increasingly serious congestion problems at airports worldwide by making air services available at city-centre heliports or specialist tilt-rotor "vertiports".

The success of the tilt-rotor aircraft in its initial military role is likely to speed its acceptance for commercial use. Initially, however, Bell-Boeing are developing it under a US Navy contract. Six prototypes will be built, but eventually nearly 1,200 V-22s are expected to be used by all the US armed forces.

The US Navy is buying 50 for search and rescue, logistical support and special warfare; the US Marines 500 for amphibious troop assault and support; and the US Air Force will take 50 for special operations.

In addition, a further 300 Ospreys for naval anti-submarine warfare are planned, while the Army may buy up to 230 for special operational missions and medical evacuation. First deliveries are due in the early 1990s.

Other countries are studying the concept. In the UK, British Aerospace is associated with Bell-Boeing in tilt-rotor studies, initially for military use, but with eventual civil applications also in mind, while Bell-Boeing is also working with Dornier in West Germany.

BAA's studies include Special Operations Warfare/Rapid Deployment, where tilt-rotor aircraft could be used to put armed troops deep into enemy territory, and retrieve them, without the need for refuelling the aircraft.

The tilt-rotor, in BAA's view, is the only effective vehicle for this type of long-range special operations mission, and far better than any helicopter, which would have less range and payload, and be slower. In fact tilt-rotors could eventually rival large helicopters in a wide range of civil and military duties.

In Japan, Bell-Boeing have signed a pact with two leading trading companies, Mitsui and C.Itoh, to assess the military tilt-rotor markets in that country.

Extensive civil studies have also been conducted in the US, by a Bell-Boeing team supported by Boeing Commercial Airplanes, the National Aeronautics and Space Administration (Nasa) and the Federal Aviation Administration (FAA).

This has examined the use of tilt-rotors in a wide range of sizes carrying from eight to 75 passengers, covering operations in such markets as high-density metropolitan and low-density population centres, cargo/package express operations, public services, and resources development.

In such roles the civil tilt-rotor is regarded as a unique vehicle with a large market potential, superior to multi-engine helicopters under most operating conditions.

But it is recognised that tilt-rotors with civil tilt-rotors must depend heavily on success in the military market, with defence funds bearing the brunt of development costs.

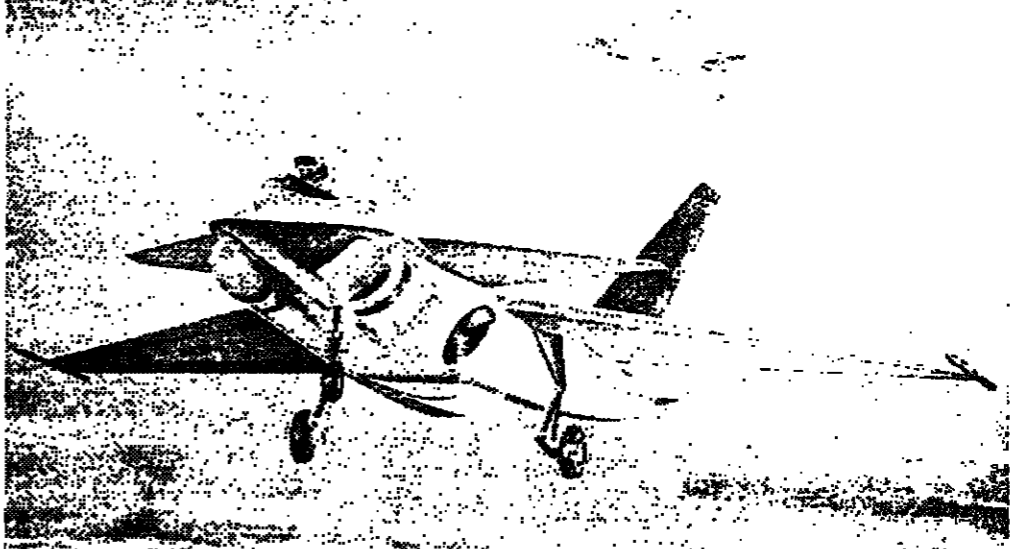
The study team also stresses that some additional work is needed to maximise the tilt-rotor's competitive economics, through the application of advanced technology and innovative design. To ensure this, a national civil tilt-rotor transition plan, including suitable infrastructures such as vertiports, and a technology demon-

stration programme, are needed.

The FAA has embraced the tilt-rotor concept with enthusiasm. Earlier this summer, Mr Alan McArthur, the administrator of the FAA, said he believed the FAA would be in a position to certify commercial tilt-rotor type aircraft for flight demonstrations as early as 1992-93.

This is based on an agreement between the FAA and the US Department of Defence to give FAA access to military technology on tilt-rotors, thereby saving "five to eight years" in the civil certification process.

The FAA has set up a civil tilt-rotor co-ordinating office, reporting directly to Mr McArthur, to facilitate all FAA activities in tilt-rotor developments, while the FAA has also allocated \$3m for tilt-rotor research and development, including planning for instrument approach procedures to vertiports, airborne systems, air traffic control procedures and verti-port designs. A rival to the Bell-Boeing



Artist's concept of a Lockheed super-sonic STOVL (short take-off, vertical landing aircraft) fighter aircraft for the US forces in the 21st century. It would have a single vectored-thrust engine that diverts air downward and use composite materials extensively in the airframe.

30 passengers at about 300 knots over distances of some 600 nautical miles. Eurofar is well behind the Bell-Boeing tilt-rotor though, largely because it has no government funding as yet, and initial deliveries are not planned before the end of the century. So far, Eurofar is the subject of a private-venture three-year study financed by the partici-

pating companies, of which about two years has still to run. The future of the European venture clearly must depend upon governments becoming interested in it as a possible military vehicle, unless a commercial airline or other potential user becomes involved.

Michael Donne

Advertisement for the Civil Aviation Authority (CAA) featuring the headline 'SEE FOR YOURSELF HOW WE'RE DEALING WITH INCREASING AIR TRAFFIC'. The ad includes text about the new Air Traffic Control System, the 'tunnels in the sky' concept, and information about the Farnborough Air Show (Stand J28, Hall 4, 4th-11th September). It also features the CAA logo and contact details: CAA House - Dept. CCF - 45-59 Kingsway - London WC2B 6TE.

Many things can happen to a promise.

A promise can be broken.

It can be ignored.

Or simply forgotten.

A promise can be put on the back burner.

It can be attributed to someone else.

Or just lost in the shuffle.

A promise can become procrastination.

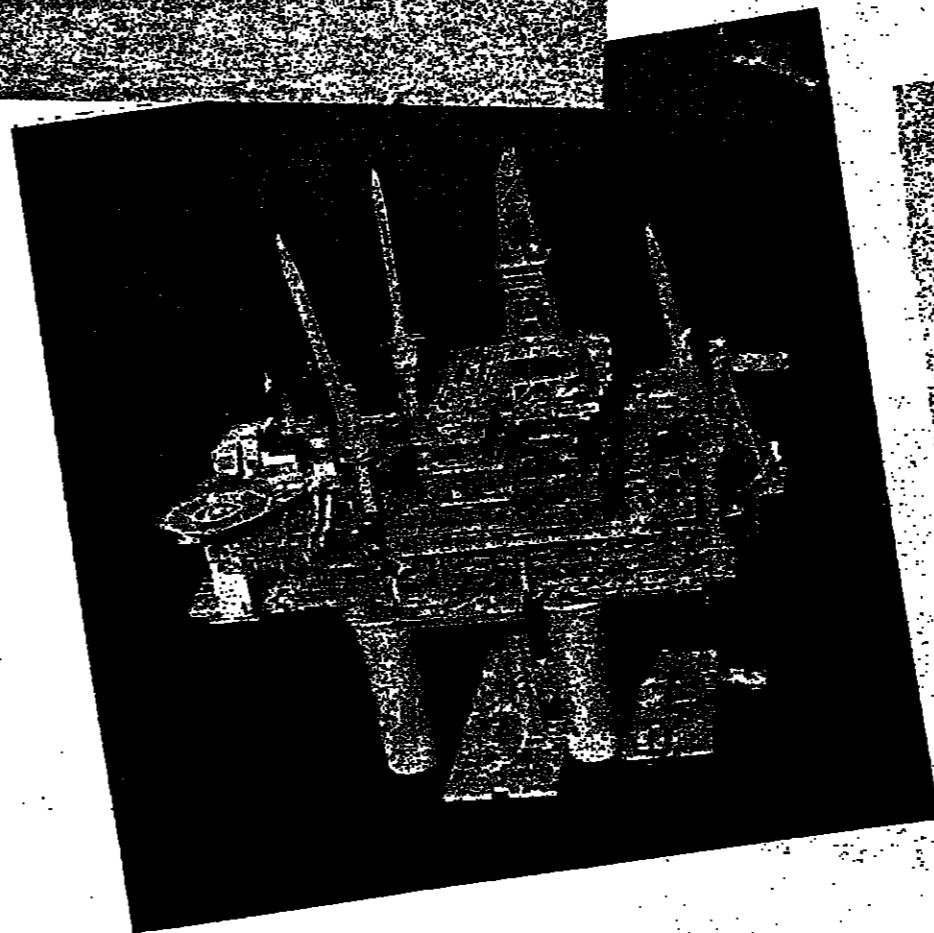
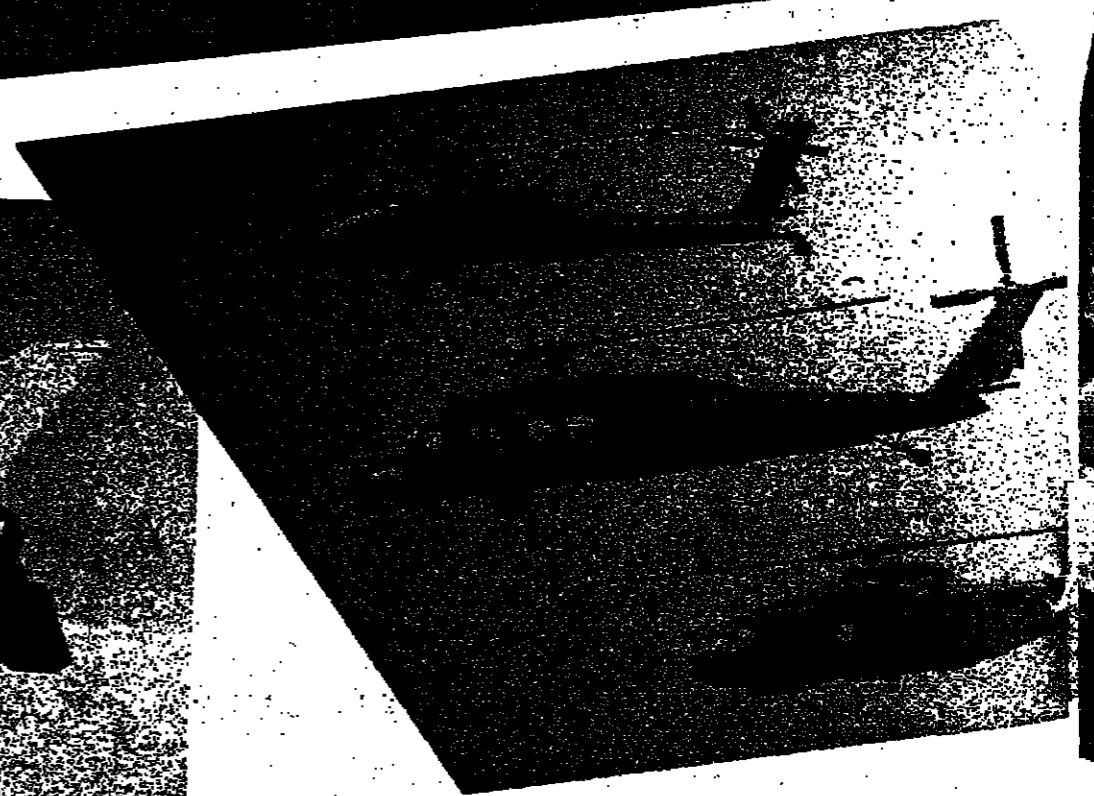
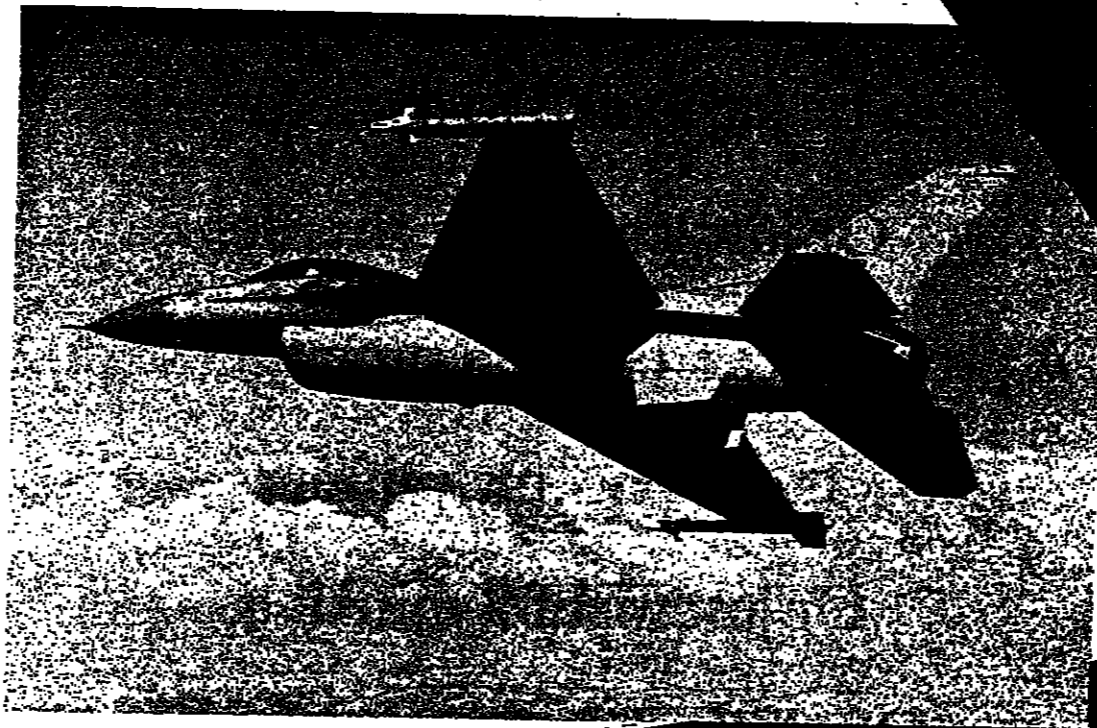
It can become puffery.

Or just wishful thinking.

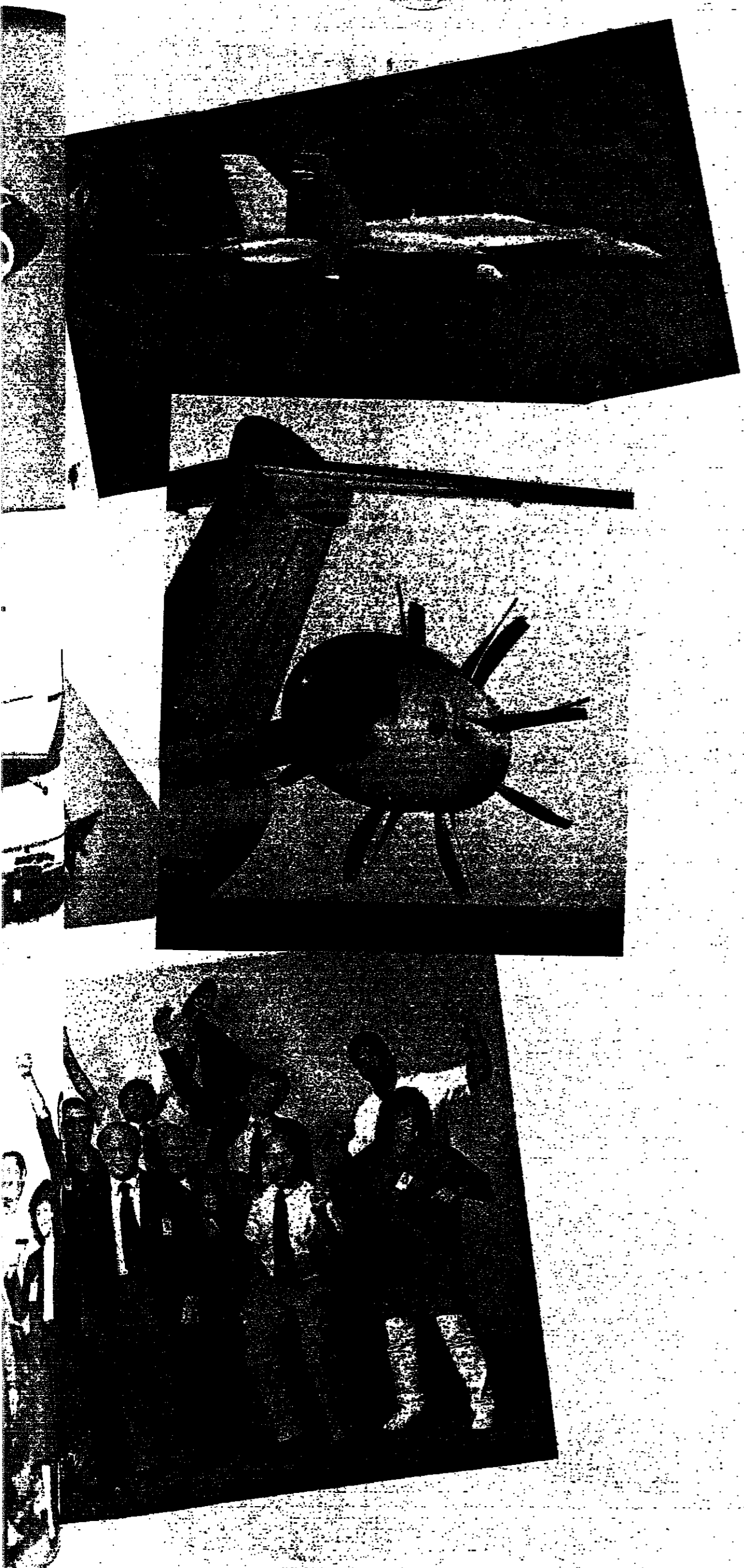
Of course, there is one more
thing that can happen to a promise.

A promise can be kept.

Keeping there



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We're keeping the promise of unsurpassed product quality and service support with a worldwide network of dedicated GE people who have never forgotten that the customer is number one.

GE Aircraft Engines
Keeping the Promise

AEROSPACE 13

THE UK

Exports boost continued expansion

THE UK aerospace industry continues to expand, and turnover during 1988 is expected to exceed £2.5bn, of which well over £500m will be as exports.

Figures compiled by the Society of British Aerospace Companies, based on Customs and Excise returns, show that the industry earned a balance of payments surplus last year of £5.6bn, with exports amounting to a record £5.6bn, 12 per cent more than in 1987.

The UK industry, in turnover terms, ranks second in the Western World to that of the US, but while the US exports only 20 per cent of its aerospace output, the UK exports 60 per cent.

Commenting on these statistics, the SBAC says that the industry is becoming increasingly competitive. Although the labour force has declined from 230,000 to 200,000 in recent years, this has been accompanied by a significant increase in turnover in real terms which means a really substantial increase in productivity.

The SBAC adds that productivity in the aerospace industry has doubled over the last ten years, as companies have trimmed labour forces and invested heavily in new manufacturing techniques so as to remain at least up with, if not ahead of, the competition, primarily from the US.

Over the remaining years of this century, the UK industry is expected to benefit substantially from the far-reaching Memorandum of Understanding signed earlier this summer with Saudi Arabia.

The memorandum provides for the supply of substantial quantities of military aircraft and associated infrastructure equipment, including new air bases, which together with other items such as warships, could amount to more than £1bn of business in the next few years.

The deal stems from the Saudi desire to build up its own armed forces as a result of recent military tensions in the Middle East and especially in the Gulf area.

The UK, and especially British Aerospace, has a long history of supplying military aircraft and associated infrastructure to Saudi Arabia, and it is clear that the latter's satisfaction with past performance has been a major factor in the new arrangements.

So far, it is stressed, only a memorandum of understanding has been signed, and the

detailed individual contracts for the Saudi requirements across the spectrum of envisaged in the memorandum have yet to be negotiated.

But many companies in the UK aerospace industry will benefit, especially British Aerospace which is the lead contractor under the memorandum, through which other contracts will be channelled.

Although no details have yet been revealed - indeed, detailed contracts have yet to be negotiated - in the long term BAE is expected to win new orders for at least another 45 Panavia Tornado fighters, about 60 Hawk 200 light combat aircraft and trainers, together with some military variants of the Type 145 four-engine transport and the Type 125 light business and liaison jet.

Substantial business is also likely to be gained by Westland on helicopters (over 80 are envisaged, including possibly some EH-101 multi-role helicopters, Lynx multi-role aircraft and WS-70 Black Hawk helicopters).

Rolls-Royce, together with

Turbomeca, will benefit from additional Adour engines in the Hawk 200, and with its partners in Turbo-Union from the RB-199 engines for the Tornado. Rolls-Royce and Turbomeca could also benefit from the provision of the RTM-322 engine for the WS-70 helicopters.

Many of these contracts may take months to settle in detail, but overall the prevailing view is that the UK has now taken over from the US as the major military supplier to Saudi Arabia.

Meanwhile, some major restructuring of the UK industry has been under way, and some more may yet occur. Both Rolls-Royce and British Aerospace are now privatised, and considerable internal reorganisation has been under way in both companies, to streamline management, reduce costs and increase their competitive power in world markets.

Within British Aerospace, which has now acquired the Rover motor-vehicle manufacturing group, the structure of the business is being reorganised to give more power to the

divisions - Military Aircraft Dynamics, Civil Aircraft and Space & Communications, together with BAE Enterprise - to enable them to operate virtually as separate profit-earning businesses.

This devolution is expected to be complete by January next year and is designed to enable the divisions to respond more swiftly to market developments.

A further major development has been the UK Government's decision to privatise Short Brothers, the aerospace manufacturer based in Belfast.

This will be done by inviting offers from potential buyers for the company as a whole.

It is now recognised that to try to break up Shorts and sell off its constituent parts, such as aircraft building, missiles and "aerostructures" (making parts for other manufacturers' aircraft) would be a disastrous policy which could destroy the company since the divisions are so closely linked.

No timetable for privatisation has been set, but it seems likely to be in late 1989 or early 1990.

Short Brothers has been Government-owned since 1943 and, as outlined elsewhere in this survey, has been seeking international partnerships for possible new ventures in the regional aircraft market, including the FJK regional jet airliner.

One significant feature of the UK industry's recent overall export performance has been the big contribution by the equipment companies, of which there are more than 50 in the UK, making the British aerospace equipment industry the largest and most capable in the Western world outside the US.

The equipment industry includes many big companies that are major international operators in their own right, often with a range of other products outside the aerospace industry, such as Dowty, Dunlop, Fairley Group, Ferranti, Flight Refuelling, GEC group (including Marconi), Lucas Industries, Plessey, Smiths Industries and Thorn-EMI.

The export turnover of the UK equipment industry in 1986 (the latest year for which full figures are available) amounted to £2.2bn, which was equal to that of the equipment industries of France (£1.5bn) and West Germany (£800m) combined.

A substantial proportion of all UK aerospace research and development outlays are spent in the equipment industry, and there is no item from aircraft on-board systems to ground-support equipment that cannot now be obtained from a UK maker.

The world aerospace equipment market is massive. At least 25 to 30 per cent of the cost of any aircraft is directly attributable to the equipment and systems (other than engines) that it carries.

These range from avionics systems such as navigation equipment, flight instruments and on-board computers, through to tyres, wheels, brakes, hydraulics, control systems, air conditioning equipment, seating, galleys, toilets and interior decor in commercial aircraft, but excluding weapons systems (such as missiles) in military aircraft.

On that basis alone, out of the anticipated spending of over \$1,800m (over £1,000m) on new aircraft, engines, missiles and spacecraft and other aviation related activities between now and the end of this century, anything up to \$600m is likely to be spent in the equipment industries worldwide.

But the competition is fierce and is intensifying, and the development costs of new items of aircraft equipment can be high. This has led increasingly to "teaming" between equipment manufacturers on an international basis, just as it has with airframe and engine manufacturers, to bid for major contracts on the new generations of civil and military aircraft now under development, especially the Eurofighter and the new Airbus A-330 and A-340.

But it is also significant that many of the UK companies have over recent years become more international in their outlook, and many have been successful in winning contracts in that most competitive of markets, the US itself, often independently, but also sometimes involving direct links with major US companies.

At the same time, many of the UK companies have directly extended their links with the US by buying companies there, a trend which seems likely to increase in the future.

Michael Donne



Bae 125 executive jet, used here as an air ambulance

Michael Don

ITALY Building strengths in collaboration

IN A COUNTRY which looks to industrial collaboration as both a vehicle for growth and the acquisition of new technology, no company has been more active in building international links than Aeritalia, Italy's main aerospace company which is part of the Iri state holding group.

With manufacturing and development partners ranging from Brazil to Spain, from the US to France, the company has steadily developed from a medium technology assembler of aircraft to an increasingly specialised designer and operator in advanced materials.

Unusually for a European company, Aeritalia has ties with both of the US major airframe manufacturers, Boeing and McDonnell Douglas.

With the former, it is now producing parts for the Boeing 767 airframe, including wing flaps, vertical tail panels and the radome. But it regards as

its piece de resistance the 11-metre rudder for the 767 which it claims is the largest single part manufactured in carbon fibre.

But the longer relationship is with McDonnell Douglas. This began in 1965 and has largely consisted of the supply of fuselage panels for the DC-9/MD-80 aircraft, the DC-10/EC-30 and, most recently, the new MD-11 programme.

Each programme has seen a steady deepening of the Italian company's participation, so that with the MD-11 it is a "programme participant" responsible for more than 12 per cent of the airframe production - the highest proportion ever contracted out by a US manufacturer to a foreign partner.

While retaining the basic structure of the DC-10, the MD-11 will incorporate the most advanced technologies and materials, together with

new generation engines and avionics.

Aeritalia's agreement with the American company gives it full responsibility, and a share of the financial risk in the development and production of fuselage panels, winglets and vertical tail fin. In addition, Italy is providing key parts for the cargo section of the combined passenger/cargo version.

The work alongside McDonnell Douglas by no means finishes here. The two companies are now closely involved in the Technology Readiness Programme which aims to exploit the full benefits of the new prop-fan engine technology.

In a revenue-sharing agreement, they are working to adapt the MD-80 to prop-fan propulsion in the form of the so-called MD-91 - because 1991 is the year in which it is hoped to introduce it into scheduled service, depending on the airlines' willingness to buy.

The agreement gives Aeritalia the right to participate in all phases of the research and planning of the new aircraft.

The General Electric engines of the flight demonstration version of the MD-91 have been installed using the pylons manufactured at Aeritalia's Pomigliano d'Arco plant near Naples.

Such work is becoming an increasingly important factor in the group's steadily strengthening financial fortunes, which have moved from a slender 14bn profit on sales of L880bn in 1983 to a profit of L51bn (about £1.7m and up 40 per cent on the year before) on sales of L1,783bn last year.

Many of its commercial hopes are now firmly pinned on the ATR-42/72 joint programme with France's Aerospatiale whose fortunes do not seem to have been adversely affected by the tragic crash of an ATR-42 in the Italian Alps last November.

This version has now attracted firm orders for 140 units since its launch in 1986, together with 72 options. At present, 30 ATR-42 aircraft are being flown by 98 different airlines and interest is now beginning to stir in the stretched 72-seater version which has so far attracted 17 firm orders and 33 options.

Development of Aeritalia's civil aviation programmes sits alongside a maturing involvement in military work - again on a solidly international basis.

Following the Tornado programme, in which Aeritalia's share is 12.4 per cent through the development and manufacture of the aircraft's variable geometry wings, the Italian company is now working on the European Fighter Aircraft project. Here its share of work amounts to 21 per cent.

Other collaborative projects also include the AMX fighter

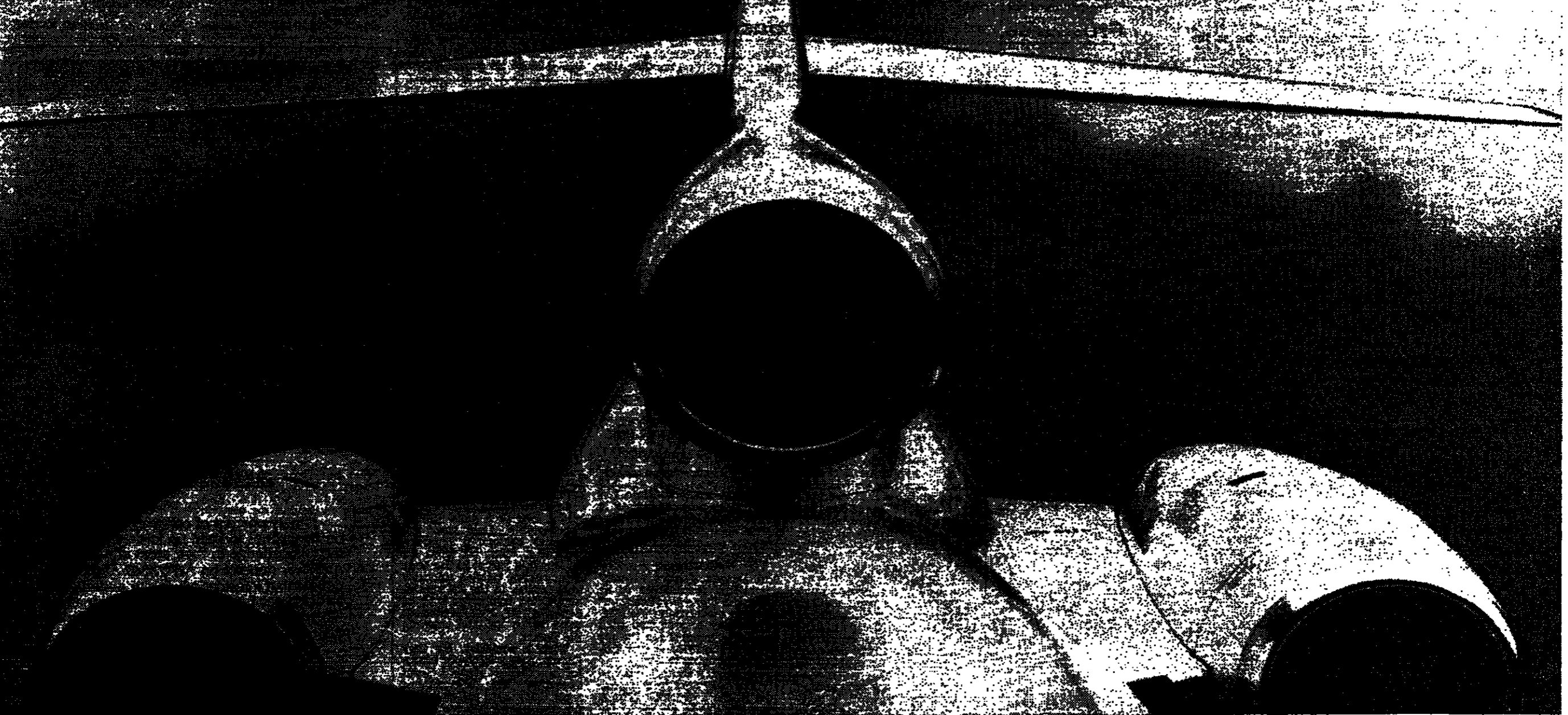
with Embraer of Brazil.

Concern to be in the forefront of new technologies has also taken the company into space projects through the European Space Agency. At the same time, Aeritalia is working on important contributions to the telecommunications, Olympus and Eutelsat.

With headquarters in Naples and 16,000 employees in 13 establishments around Italy, the company is organised around seven operating units: combat aircraft, transport aircraft, avionics and equipment, space, general aviation assistance, guidance systems and missiles and engines.

Its reach has been further strengthened by taking a 31 per cent stake in Rinaldo Piaggio which is in the final stages of developing a small jet for business use.

John Wyles



The three-engine Falcon 50 and 900. Executive jets as safe as airliners.

Of course you could stick with comparing operating ranges, cruising speeds, usable cabin space and the soundproofing of other private jets. Which, just between us, would only again highlight the advantages which are the strength and reputation of the Falcon the world over.

But the comparison stops there for one very simple reason. The Falcon 50 and 900 have three engines.

Use of a third engine positions both of these aircraft at the very strictest level of safety, that imposed

on airliners making overwater flights via the shortest routes. This provides the aircraft with additional power always at the ready for the systems which ensure your comfort and safety.

To understand the essential role, vital in the power factor, especially when flying over inhospitable zones, just

keep in mind the importance of the on-board electronics of a long-range aircraft.

Objectively speaking, the security offered by the three-engine Falcon is comparable to that of commercial airliners, not of other corporate jets in their class. This is of course why executives prefer the Falcon 50 and 900.



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AEROSPACE 14

THE NETHERLANDS

Fokker's fortunes recover

FOKKER, the Dutch aircraft maker, is pulling out of one of the worst tangles in its turbulent history but still faces heavy headwinds.

Last autumn Fokker was rescued financially by the Dutch government as runaway production costs for its two new aircraft left the company struggling.

But since then Fokker's fortunes have soared. New orders are pouring into the company's Schiphol headquarters - three times as many in the first half of this year as all of 1987.

The order book is full until 1990 and the production tempo is being stepped up.

Stockholders snapped up a share issue so eagerly last spring that the Dutch government was left with only 16 per cent of the company instead of the expected 49 per cent.

But despite the impressive recovery Fokker almost certainly will not survive alone.

Development costs of new aircraft are so heavy that a small aerospace company such as Fokker cannot carry them.

Further, the Hague ordered Fokker to find a business partner by 1990 as part of the strings on its rescue package.

Mr Reinder van Duinen, one of the three members of the board, says Fokker is talking to any number of European aerospace companies, including Messerschmitt-Bölkow-Blohm (MBB).

The West German aerospace company already makes fuselages for the Fokker 100 and the co-operation was deepened last year when MBB and Fokker signed a collaborative pact on further joint efforts, including a possible merger.

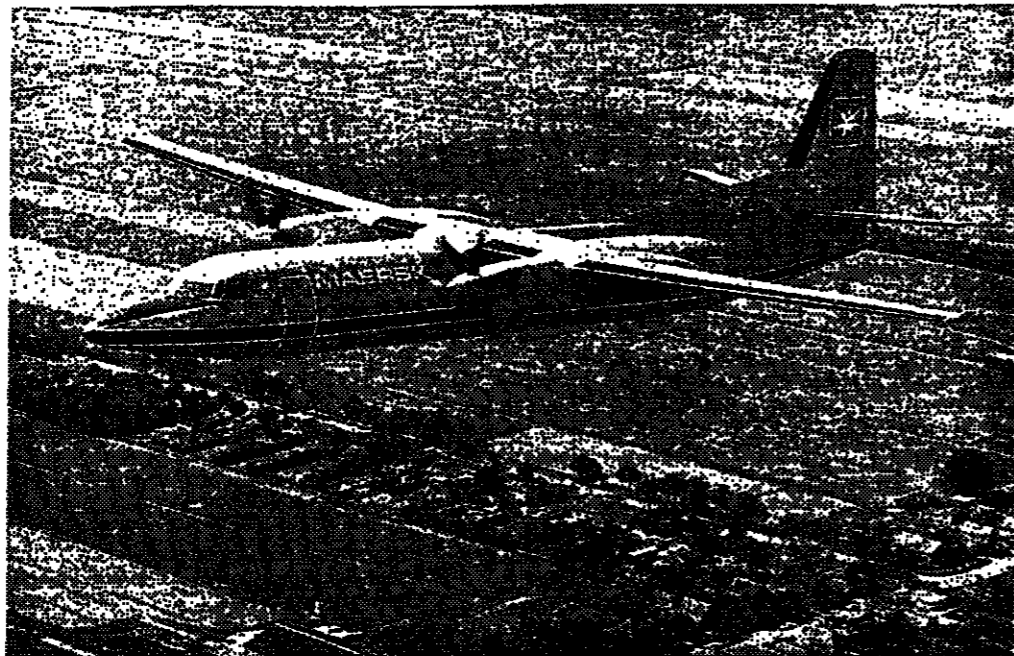
Fokker specialises in commuter aircraft such as the 50-seat Fokker 50 turboprop and 100-seat Fokker 100 twin-jet.

Since its founding in the early part of this century, the company has glided along as an independent, but last May the Dutch government took a 16 per cent stake as part of its rescue package.

That stake will be raised in a second rights issue this autumn although it will be no higher than 49 per cent. An issue price of fl 20 per share was stipulated in the rescue package but that is currently being negotiated.

Under the rescue package Fokker received fl 212m in fresh aid from the Government plus relaxation of repayments on some development credits.

So far, the state has provided a total of more than fl 900m in development credits and com-



The Fokker F-50 turbo-prop airliner which is now winning widespread acceptance among airlines world-wide

mercial banks another fl 400m in new credit lines.

Fokker suffered a loss of fl 107m on sales of fl 1,060m in 1987. Development costs of the short-haul F-50 and medium-haul F-100 have surged to nearly double the original estimate - fl 1.6bn instead of the original fl 1bn.

But the company expects to at least break even this year when cashflow improves as a result of the fresh loans. A sweeping cost-cutting programme is also being launched but probably will not yield results for a couple of years.

Nevertheless, serious problems remain. Fokker is barely able to deliver aircraft on time, the most recent example being in July when it said 10 F-100s for KLM Royal Dutch Airlines would again be delayed.

Launching two new aircraft at the same time has proved profoundly more difficult than expected. Aircraft parts have not been ready on time, production managers have been ill-informed and employees have been restive about emergency overtime work.

Mr van Duinen says assembly lines are now rolling more smoothly and the production tempo of both aircraft is being stepped up. About three F-100s per month are supposed to roll off the line by the middle of next year compared with one a month now.

The question is whether that is soon enough. Sufficient cash flow is needed to service the

higher debts that have sprung from the rescue package, at least fl 433m.

A debt-to-equity ratio is difficult to calculate, explains Mr van Duinen, because the government development credits can be viewed as either debt or equity. But he does concede that the debt burden is more punishing now than government credits have been put on the balance sheet.

The low dollar has not made life easier for Fokker although currency problems are milder than in the past. Because aircraft are always priced in dollars and Fokker's costs are in guilders, the Dutch company's competitiveness has suffered, especially against the American giants Boeing and McDonnell Douglas.

Dollar costs are hedged for this year and next and Fokker also is trying to move production to low-cost countries. Just recently, an agreement was reached with IPTN of Indonesia to make some parts for the F-100 in that country.

Within Fokker, management is struggling to repair its ranks after a rash of resignations over the past year. Two of the three members of the management board, including Mr van Duinen, are new, as are a flock of middle-level managers.

A psychological blow was dealt by the sudden resignation of Mr Harry Langman, chairman of the supervisory board and a captain of Dutch industry, earlier this year.

The only chief executive who has remained to provide much-needed continuity is Mr Frans Swartouw, Fokker's swashbuckling chairman. He determinedly refused to resign late last year when several Members of Parliament vociferously urged him to do so in light of the company's troubles.

For the future, Fokker will soon have to start considering a successor to the F-50 and F-100, a decision which will be the major impetus behind a joint venture of whatever kind.

Various combinations of small aerospace groups have been mentioned, including Fokker, MBB, Saab-Scania, Construcciones Aeronauticas and Short Brothers.

Some movement could come in September when Daimler-Benz is supposed to decide whether to take over part of MBB. That could pave the way for a deal between Daimler and its aerospace subsidiary, Dornier, MBB and Fokker.

Fokker has been down this road before with an ill-fated merger with VFW, a forerunner of MBB, in 1969 and a joint venture with McDonnell-Douglas in 1982. In those cases both partners optimistically hoped to exploit the burgeoning market for commuter aircraft that was being unleashed by "open skies" policies.

But now sheer survival is at stake and greater willpower is likely to be the determining factor.

Laura Rasm

SWEDEN

Lean period in the offing

THE SWEDISH aerospace industry, centred around Saab-Scania, faces a lean period. The large investment needed to develop and produce the JAS-39 restricted defence combat aircraft and the Saab 340 commuter airliner means that the company's aircraft division probably will not recover sustained profitability until the early 1990s.

The division reported a loss of Skr 33m in 1986 and Skr 43m in 1987 despite a 36 per cent rise in revenues, due largely to sales of the Saab 340, from Skr 3,270m to Skr 4.4m.

The last two years of losses underscore the risks Saab-Scania has taken in the aerospace sector during the 1980s. It committed itself to developing what is claimed to be the world's first truly multi-role combat aircraft, able to intercept, attack and carry out reconnaissance missions without special variants, under a strict fixed-cost contract.

Simultaneously, it decided to embark on its first major foray into the competitive civilian aircraft market with the Saab 340.

While the gamble on this aircraft appears to be paying off, there are growing doubts that the JAS-39 programme, Sweden's largest military project, will generate major profits for the four-corporation consortium, headed by Saab-Scania, that is building the aircraft.

A report released in July by the Swedish defence procurement agency FMV disclosed that development of the JAS-39 had fallen a year and a half behind schedule, creating "a risk for unplanned cost increases." Analysts believe the delay could add another Skr 1bn to the project's approved budget of Skr 40.8bn.

The JAS-39 consortium, which includes the Saab Aircraft Division, Volvo Flygmotor, Ericsson Radio Systems and ITV Aerotech, would have to bear any extra costs under the programme's fixed-cost contract.

FMV said the delays centred on the development of the aircraft's RM-12 engine, a modification by Volvo Flygmotor of General Electric's 494 engine, and its advanced fly-by-wire flight control system.

As a result, the first flight of the JAS-39, originally scheduled for the autumn of 1987, has been postponed until late 1988. FMV has warned that a delay in the aircraft's initial delivery date, set for 1992, "cannot be ruled out."

The Swedish Air Force has placed an order for 30 aircraft, with an option on another 110.



Production of the Saab 340 twin-engine commuter airplane, Linköping: civil aircraft may eventually prove to be the salvation of Sweden's aerospace industry

However, the possibility that the Swedish Air Force deal may bring in only slim profits has increased pressure on the JAS-39 consortium to find export orders.

Although Sweden has not successfully sold any combat aircraft abroad since the Draken of the 1960s, Saab's president, George Kärnsund, argues that the JAS-39 has a better chance to find foreign customers than its costly predecessor, the Viggen. It is lighter, more versatile and easily maintained by conscript personnel, making the JAS-39 ideal for smaller countries.

Saab concedes though that prospects for foreign sales are likely to diminish if the Swedish Air Force decides not to order a two-seat trainer version, the JAS-39B. Potential buyers, which include Austria, Switzerland, Norway, Denmark and Finland, have indicated that they would drop consideration of the aircraft if the trainer is not provided.

FMV has stated that "there is no room in the current JAS framework" to support development of the trainer aircraft. The estimated development cost of the JAS-39B is said to have climbed from Skr 600m to Skr 1.8bn. A final decision on the JAS-39B is expected in late 1988, with the Swedish Air Force considered likely to opt for training JAS pilots on simulators instead.

Saab says it will not develop a trainer on its own, explaining that this would be too expensive.

Saab must also worry that a slip in the production schedule will harm export orders. It has already lost a lucrative contract with Switzerland for the JAS-39 since its initial export

exceeded the Swiss deadline. Saab is also finding that the country's restricted defence budget may threaten its future development of missiles. Having completed work on an air-launched version of its RBS-15 anti-ship missile, Saab's missile division recently proposed developing a first-generation "fire and forget" air-to-air missile for the JAS-39.

The project would involve cooperating with British Aerospace on an improved version of the latter's Skyflash followed by a Swedish-built missile with greater range.

But the Swedish government is talking at the programme's estimated Skr 6bn price tag. It may decide to order the updated Skyflash 90 directly from British Aerospace, leaving Saab without a major missile development project.

The future appears brighter for Saab's civilian aircraft programme. Since the Saab 340 went into production in 1984, the company has succeeded in its goal of capturing a third of the world market for 30 to 40-seat twin turbo prop commuter aircraft, with 140 delivered or on order to 37 airlines. Saab's main competitors are the de Havilland Dash 8 and Embraer's Brasilia 120.

The Saab 340 has become the market leader in its category in Western Europe with a 70 per cent share and the company claims a third of the rapidly-growing US market. A small foothold in Asia has also been established through a deal with a Taiwanese airline.

In an effort to increase sales,

Saab has begun production of a new version of the 340 with a more powerful General Electric CTD-9 engine that boosts the aircraft's speed from 500 to 650 kilometres an hour. The company is also considering developing a stretched version that would seat 50.

Although its order book is nearly full, Saab will have to wait several years before it reaches the break-even point on the commuter aircraft, which was originally a joint programme between Saab and Fairchild of the US.

The US manufacturer pulled out in 1985 for economic reasons, forcing Saab to invest another Skr 600m for the construction of a new wing factory and other production facilities. This raised the break-even point for Saab from 200 aircraft to 250-300 and caused delivery delays.

Saab and its Swedish aerospace partners, principally Volvo Flygmotor, have long relied on military orders for their survival, but civilian aerospace business is expected to be increasingly important to their future.

For example, civil aircraft orders will bridge the gap between the phase-out of Viggen production in 1990 and the start-up of the JAS-39 in 1992.

Aware of their over-dependence on military funding, Saab and Volvo have been seeking participation in international military programmes during the 1980s and the civil aircraft route may prove eventually to be the salvation of Sweden's aerospace industry.

John Burton

Advertisement for Gulfstream IV featuring the headline 'When you attend Farnborough '88, let us show you the result of making an airplane as perfect as it can be.' and a large image of the aircraft's wing and tail section.

Advertisement for Belgium titled 'BELGIUM Fighter choice close' discussing the Belgian aerospace industry, the Rafale fighter project, and international collaborations with France and Germany.

Advertisement for Aerospace magazine titled 'The voice of authority for engineers with authority.' featuring a large image of an engine or component and text about the magazine's content and subscription information.

AEROSPACE 15

Spain's troubleshooter finds the going tough

Deeper losses jolt public sector favourite

SPAIN'S AEROSPACE manufacturer Construcciones Aeronauticas (CASA) has gone in a couple of years from being the darling of the public sector...

CASA recorded pre-tax losses of Pta 14,200m in 1987, the worst in its history. The disastrous results have at least jolted the company's proprietors...

The duration of a four-year viability plan. Productivity comes high on the company's rescue agenda. According to Mr Alvarez Vara, income should be in excess of Pta 8m per each of the company's 10,000-odd employees...

Douglas to withdraw some Pta 200m-worth of business from the Spanish company in the past year. The four-year viability plan which Mr Alvarez Vara announced with the New Year included severe action aimed at boosting plant activity...

Factors promising the turnaround are a productivity increase which will raise income from sales to Pta 90,700m in 1990 and 1991, and a financial restructuring that will raise capital from the Pta 90m 1987 figure to Pta 33,700m in four years' time...

required minimum to support an aerospace industry and the domestic market is puny. CASA's fall into financial troubles was caused by its necessary dependence on the highly-competitive international market...

have been punishing and the returns have yet to be seen. CASA hopes to sell some 15 military versions of the aircraft a year and a further seven for civil use. The chief market is formed by the developing countries...

Sophisticated specialisation lies behind the CASA's collaboration in the MD-11 project for the Spanish company will be providing the stabilisers. This is a technology developed by CASA in part because of its role in the Airbus project...

All parties are in broad agreement that the company needs to be modernised

announced with the New Year included severe action aimed at boosting plant activity. A redistribution of work systems at the company's plants in Seville, in Cadiz and in Getafe, south-east of Madrid, seeks to reduce 700,000 subcontracted labour hours to 300,000.

The financial ratios of the four-year plan are ambitious. Mr Alvarez Vara seeks to reduce pre-tax losses to Pta 10,700m this year and to Pta 3,900m next year. The year 1990 has been earmarked as the point that CASA turns the corner with Pta 600m profits and the plan envisages a rise to a Pta 1.2bn profit in 1991.

ISRAEL

Looking for a new identity

ITS WINGS clipped by last year's government decision to cancel the Lavi combat aircraft, state-owned Israel Aircraft Industries (IAI) is casting around for a new identity - as well as a convincing raison d'etre. After a generation of steady progress up the rungs, from repairs and upgrades to designing and building its own military aircraft, Israel's aerospace industry without question has been brought back to earth with a painful thump.

craft, has been halted, while prospects for the four-year-old Astra executive jet, only 12 of which have been sold after development costs of USD 200m, do not look good. The Lavi was intended to give the country strategic independence from foreign supply directly and the balance from Foreign Military Sales (FMS) aid - as well as two thirds of the money allotted to the Cobra upgrade.

year as a "Nato-equivalent" ally. This permits Israeli companies to bid for Pentagon contracts on an equal footing to those from Western Europe, and could be of considerable value. Ever since France's arms embargo at the time of the 1967 Arab-Israeli War, the country's aircraft procurement policy has been directed exclusively to the US, a practice reinforced by the latest acquisitions and planned purchases of both the Mirage 2000 and the A-4, the civilian carrier. Seventy five of General Dynamics' latest production F-16 interceptors - the F-16C/D - are currently being delivered in straight compensation for the Lavi, together with five more top-of-the-line F-15s.

IAI would dearly love to enter into a co-production agreement with the US company on the even newer "Agile Falcon" variant of the F-16 as well, but has been temporarily blocked in its ambitions. According to a specialist Israeli defence publication, Sword, the Israel Defence Forces also has its eye on the McDonnell Douglas F-18, and on new assault helicopters such as the Sikorsky Black Hawk or the McDonnell Douglas Apache AH-64.

However, in a significant departure from its established practice, for the first time in a quarter century El Al has gone back to Rolls-Royce engines, choosing the RB-211 power plant for the twin-engine 757s over its US rivals. For the second phase, intended for the early 1990s, El Al says it is considering acquiring an unspecified number of Boeing 747-400 and 757-300ER passenger aircraft. The latter will be capable of flying non-stop from New York to Tel Aviv, the airline's most important route, and are envisaged for low-season periods when the big 747s are not required.

the cost benefits of this approach to modernisation. The F-4 Phantom, a work-horse fighter/bomber still in service with many airforces around the world, has been revamped extensively and dubbed the Phantom 2000. The old Mirage III and V aircraft, and the A-4, have similarly been given a new lease of life. Colombia, which has a close military relationship with Israel, recently sent its Mirage Vs for upgrading, according to Sword, in a deal worth \$30m. It

But, in the fiercely competitive world of military exports, the Israelis are finding that little quarter is given by anyone. A prospective contract with Spain to upgrade its large fleet of Mirage Vs was lost to France, while a planned sale of Kfir's to Honduras was snatched away by the US itself.

Andrew Whitley

Not a single manned aircraft is either in production or being seriously contemplated



McDonnell Douglas demonstrates their new MD-91 prop fan airliner at Farnborough this year for the first time, with an eye to winning the first orders from the airlines. The fuel-efficient engines offer a breakthrough in flying costs

The meek may inherit the earth. But the bold will switch carriers.



The Dash 8 sets bold new standards for regional airliner reliability, boosting passenger loyalty to new heights. Durability. True to the de Havilland tradition of robust aircraft, the Dash 8 easily handles the tough demands of a regional airline schedule. Its superior structural integrity delivers an economic life of 160,000 cycles.

Moreover, since routine inspections are required less often, the Dash 8 doesn't have to be sidelined for maintenance every other day or so. Maintainability. The Dash 8 is designed to make maintenance simple and fast. Components are easily accessible without fancy ground equipment. Most line-replaceable units can be

changed in fifteen minutes. Result: you can get the Dash 8 back in service quickly - and on schedule. Reliability. The Dash 8's dispatch reliability and schedule completion are in excess of 99%. You can count on the Dash 8 to leave on time. So can your passengers. Which is why operators and passengers return to the Dash 8 again and again. Which brings us to the bottom line:

Profitability. The Dash 8 is easy to maintain, cost-efficient to operate, and consistently meets performance targets. Operators and passengers know they can rely on the Dash 8. And that's the bottom line.

Reliability

Boeing Canada de Havilland Division

AEROSPACE 16

Canada's industry is reaching out and . . .

Seeking new niches

CANADA'S AEROSPACE industry has emerged much stronger from the recession and two privatisations of the early 1980s and is reaching out into international markets and trying to find new niches.

As Mr K E Lewis, President of the Aerospace Industries Association of Canada, puts it: "We must find ways to co-operate in major development projects with other nations; yet we must also ensure we can compete against the fast-growing number of players in world aerospace."

Canadian aerospace will generate sales of about C\$5.5bn this year, and about 80 per cent of production is exported. The industry employs about 60,000 and about 80 per cent of the activity is concentrated in Quebec and Ontario and the rest is spread out in the Maritimes, the Prairie Provinces and British Columbia.

Aerospace accounts for about 20 per cent of the manufacturing sector's research, mainly through Pratt & Whitney Canada, the country's sole engine-builder, and several large companies, such as Spar Aerospace, Canadian Marconi and CAE Industries, in specialist areas, such as communications, avionics and space-handling equipment. Yet, the industry knows it must invest more in research to maintain its international position.

Despite a modest 25m population and the small domestic market, the industry ranks fifth in the West. But it may soon be displaced by Japan, now putting major resources

into aerospace.

The Canadian industry designs, develops and makes an enormously wide range of products from business jets, helicopters and commuter aircraft to small jet and turboprop engines, from sophisticated electronic components to communications satellite systems, complex defence products, remote manipulation systems, and military, commercial and industrial simulators.

Yet, Canadian aerospace is gaining new confidence as an international participant, though it accepts it must remain primarily a niche player.

Several recent events support this view, such as the C\$668m acquisition of the US Singer Company's Link domestic simulation and training systems division.

The two largest Canadian airlines, Air Canada and Canadian International, are committing several billion dollars to firm orders and options for the Airbus A-320, and this is expected to lead to a C\$1bn order for Canadair Ltd to supply A-330 and A-340 airframe parts over a 15-year period.

Canadair has the maintenance contract for Canada's CF18 fighters, and improving international markets for the Challenger business jet and for its battlefield surveillance system being developed with West Germany and France.

It is planning a 48-seater commuter version of the Challenger to meet the needs of long and thin regional feeder routes.

Boeing, now owner of de Havilland Canada, has overhauled the operation completely and has won strong international support for the Dash-8 turboprop commuter aircraft and plans a new 70-passenger version.

The Bell Textron Helicopter (Canada) plant in Montreal, which started up amid furious political controversy two years ago, is quietly making two series of commercial light helicopters, while continuing longer-term development on an advanced Canadian-engineered series. A smaller plant in Ontario, MBB Aerospace Canada, began with a good Government order base.

The Bell plant may benefit directly from the choice of the Anglo-Canadian EH-101 heavy helicopter to replace the Coast Guard Sea Kings. The order may be increased substantially to more than 50 aircraft and could lead to some international specialisation.

Canada has also benefited from the transfer of defence technology from the US, and scores of smaller avionics, component and other specialised contractors supply the US military under Canada-US defence sharing agreements. But this business may soon level off with American defence cutbacks. Generally about one-third of Canada's aerospace activity is defence-related.

Besides Boeing, McDonnell Douglas is the largest US airframe builder operating in Canada. The Toronto plant is busy building MD-80 wings,

representing about 20 per cent of the cost of each aircraft.

The US remains far and away the largest customer of Canadian aerospace, despite strong efforts to diversify markets. Products move freely over the border, but US non-tariff barriers are still worrisome.

Mr Lewis remains bullish about the future, and sees industry volume reaching C\$7bn or more in 1990 or 1991. He says the industry must do more research to build on its reputation for quality and delivery. A 7 per cent of sales ratio is far below other developed nations' performance.

The industry must hook directly into international based programmes, including the hypersonic flight of the future, in order to keep up with the technological race.

But he says Canada is not turning out enough qualified engineers and technicians and lacks a national training strategy because of jurisdictional problems between Ottawa and the provinces, which constitutionally control education. Companies still lack forward planning for the most part, he says.

The heated political debate over the location of Canada's Space Agency does little to solve longer-term structural problems. The Agency may well land up in Montreal.

The Japanese preoccupation with an ultra-sonic aircraft able to fly between New York and Tokyo in three to five hours, creating teams to research advanced engines and fuselage materials, is a sign of things to come.

Canada needs to be part of such ambitions, says Mr Lewis. "We must co-operate and we must compete."

Robert Gibbens

PRIVATISATION is the dominant issue in Argentina's civil airline industry. The Radical Party government faces considerable problems with massive state spending and servicing a \$66bn foreign debt.

One of the ways it is trying to tackle these difficulties is by selling off state-owned industries including part of the national flag-carrier, Aerolineas Argentinas.

In February this year the Ministry of Public Works announced that it had begun discussions with the Scandinavian airline, SAS, to sell 40 per cent of Aerolineas Argentinas to SAS. So far no firm details have been announced about the sale, and inside Argentina there are contradictory reports on the progress of the discussions.

Even if the deal is formally concluded by the Argentine government and SAS, it still has to be approved by Congress, Argentina's parliament. There is considerable political and industrial opposition to it, and it looks most uncertain to ever happen.

Argentina's other major civil airline, Austral, was sold to private ownership in December 1987 and, according to its latest audited accounts, is beginning to achieve reasonable profits, despite the loss of a DC-9 in a crash in Misiones province in June this year.

The Argentine group Cielos del Sur took ownership of Austral last December, paying \$28m for the company. The Government assumed all of Austral's outstanding debts as part of the deal. During the first quarter of 1988 Austral achieved an audited operating profit of \$3.4m, with a break-even passenger load factor of 46.2 per cent, which it

ARGENTINA
Sell-offs for cash

claims to be one of the lowest in the industry.

In 1987 it carried a total of 1,436m passengers, with an average aircraft load factor of 57.2. Austral employs 1,980 staff: 190 pilots, 800 flight personnel, 360 technical maintenance staff, and the remainder in administrative jobs.

Presently limited to domestic routes, Austral serves 26 cities and has market participation of 25 per cent. Its fleet consists of eight BAC 1-11s (500 series) and three DC-9 80/81.

The BAC craft are directly owned by the company while the DC-9s are leased from McDonnell Douglas and will become the property of Austral in 1993. Austral is keen to expand its operations to cover routes outside Argentina, and it wishes to see keener competition in the domestic market.

Aerolineas Argentinas is in a less fortunate financial position, being saddled with a \$1.07bn debt, and dependent on government subsidies. Believed to be top-heavy in administrative personnel, Aerolineas is protected by the Argentine state, which is concerned to preserve it as a national flag-carrier.

However, the Argentine gov-

ernment has been keen to finance a part sale to SAS, with Aerolineas valued at \$475m at the beginning of August this year. Discussions on the deal have been protracted but under the terms of the sale SAS is to take 40 per cent, the Argentine government will keep 51 per cent and the other 9 per cent will be offered to the airline's employees.

A rival offer has been made by Cielos del Sur, which has brought together Alitalia and Swissair in the bid. It is known that Cielos del Sur regards the \$60m down payment SAS is expected to make as surprisingly low, and disputes the total valuation of the airline.

However, Mr Rodolfo Terragno, Minister of Public Works, who has responsibility for the privatisation programme, has firmly maintained that the deal will go ahead with SAS and not Cielos del Sur.

The Aerolineas fleet consists of six Boeing 747-200s; one 747-300; two Boeing 707s; eight Boeing 727s; 12 Boeing 737s and 4 Fokker F28s. The company runs a staff of 10,325 and in 1987 carried just over 4m passengers on domestic routes to almost all Argentine cities, and

29 international routes, with an average passenger load factor of 65.45.

The interest being shown by SAS in buying into Aerolineas is undoubtedly because of the access this would give to Latin American routes, not forgetting that, at the price, Aerolineas seems to be a bargain.

On the military front, Argentina's Fama (Fabrica Argentina de Materiales Aerospaciales) in Cordoba, is optimistic that it may soon sell the IA-68 Pampa jet trainer to the US Air Force. The Pampa has been under development since 1978, and it is thought that the US may be in the market for up to 600 aircraft. If such an order were to be made it could be worth \$2.6bn to Argentina.

In July this year Argentina conducted a successful test flight of the country's first remote piloted aircraft, the Bigua. A version of the Italian-made Mirach 100 RPV (which is sea and land-launched), the Bigua is launched from a larger aircraft, giving it a distinct advantage. A range of additional cater to the different needs of potential purchasers.

Gary Mead

BRAZIL
Limits of finance

EMBRAER, Brazil's fast-growing aircraft manufacturer, has reached the limits of its financial endurance. It must deal urgently with its ugly debt profile to keep its development timetable.

In the 19 years since its foundation, Embraer has grown to dominate two niche markets, claiming superiority in the commuter aircraft and turboprop trainer sectors.

It has begun work on a new commuter aircraft and it aims to become a big supplier of parts and structures to the main US and European jetliner manufacturers. But its AMX subsonic ground attack aircraft has got off to a difficult start.

Although it expects sales this year to grow by one-quarter to \$60m, Embraer needs to straighten out its debt problems and reinforce its capital base. Mr Ozilbo Silva, its chief executive, says he hopes to tie up a \$128m capitalisation package by the end of the year.

Embraer has already begun developing new, expensive aircraft. It is designing the CBA-123, a 19-seater commuter aircraft, and later plans to introduce an extended version of its handsome 30-seater Brasilia and an anti-tank version of its Tucano turbo-prop trainer.

Mr Silva says that by 1991: "Embraer will be in an extremely strong position, at the cost of substantial investments." He plans to cover the entire range of regional aircraft models, offering 19 to 40-seat aircraft.

Embraer must commit about \$500m to develop the CBA-123 and the 40-seat extended version of the Brasilia.

Embraer has other projects up its sleeve, such as a supersonic fighter trainer. It has presented designs to the Brazilian Air Force, which has put such a venture on hold for lack of money.

The project is unlikely to go ahead until the Air Force's finances improve.

The Government is Embraer's biggest shareholder and the Air Force its most important single customer. That is as much liability as an asset, since the federal

Treasury is close to insolvency. The company has already had to slow down deliveries of the 50 AMXs earmarked for the Air Force.

Financial engineering is now at a premium at Embraer. The Government's economic difficulties have made it difficult for Embraer to raise long-term loans. "We can't develop the CBA 123 on short-term funds," Mr Silva says.

Embraer has \$190m in short-term loans - much more than its \$150m net worth. Brades is likely to capitalise its \$138m loans outstanding to Embraer. The company expects to attract a further \$50m in debt to equity conversions from four foreign banks.

At the same time, Embraer has become an innocent victim of the United States' trade wars with Brazil. Last November, Washington said it was considering imposing punitive duties on Embraer sales to the US, its largest market.

Although the US has said since that it is lifting the threat, it has not officially notified Embraer. However, Mr Silva believes that the company will be spared the new round of trade disputes between the two countries.

These disputes have caused another big financial headache for Embraer. It has had to provide its US customers with letters of credit at a cost of \$2.8m in annual interest charges.

The letters of credit would be used to offset retro-active US duties. Embraer has orders and options for 209 Brasilia aircraft from American operators.

Foreign trade and international co-operation is becoming increasingly important for Embraer. Its domestic market

is still weak and the country's regional airlines in poor health.

As the domestic market shrinks in importance, Embraer is devoting more and more attention to its overseas business. Exports now account for 70 per cent of total sales, compared with 44 per cent of all sales five years ago.

Argentina's Fama has a 30 per cent stake in the CBA 123 project. Aeromachi and Alitalia have 70 per cent of the AMX project. The AMX has been attacked for running over cost and straining Embraer's finances, but the company rejects the criticism.

Mr Silva says he hopes to build Embraer's subcontracting business into its third main activity.

Embraer has begun shipping wing flaps to McDonnell Douglas as part of a \$120m contract to supply the MD-11 wide body airliner. And it has held talks with Spar, the Canadian satellite builder, which built Brazil's two domestic communications satellites. Embraer would supply Spar with external structures.

It has also been in touch with Boeing, which might buy structures from Brazil. Bell, the US helicopter manufacturer, discussed a cooperation deal with Embraer, but the talks petered out after Bell lost a bid to sell 52 helicopters to the Brazilian Army. A consortium of Aerospaciale and Engesa, a Brazilian armoured vehicles manufacturer, won the \$245m contract.

Embraer will probably supply the French Air Force with 70 Tucano trainers for \$140m as part of the offset deal.

John Barham

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INDIA

Hindustan still concentrates on fighters

AS INDIA'S two main national carriers - Air-India for international flights and Indian Airlines - prepare themselves for a major expansion of their fleets with aircraft purchased and leased from the US, France and the Soviet Union, the government-owned Hindustan Aeronautics (HAL) is pressing ahead with a major programme to build more Western and Soviet aircraft itself under licence.

Hindustan Aeronautics' main customer is the Indian Air Force, to which it sold aircraft and components worth RS 6,82bn in 1987-88, and thus showed a profit before tax of RS 450m.

The company's principal activities involve the design, manufacture, repair and overhaul of various kinds of aircraft and helicopters, and related aero engines, avionics equipment, instruments and other parts.

Its main production efforts are concentrated on the manufacture of fighters, and in the past few years it has been moving into new generation aircraft, shifting notably from making the now obsolete MiG-21s, with Soviet collaboration, to the later MiG series.

In 1984, its factory at Nasik, Maharashtra State, switched to

building the "swing-wing" MiG-27M (named the Bahadur or Vahant by the Indian Air Force), and the first of these began service with the IAF last January. Plans in the next decade include manufacture of the MiG-29 and even the MiG-31, once the Soviet Union is ready to transfer the know-how. Agreements in principle have been reached by the two governments on the indigenous production programme.

Other major projects of the company are manufacture of the Mirage 2000 "light combat aircraft" (LCA) and the "advanced light helicopter" (AHL), based on its own designs (although some Western assistance is involved in both ventures, including Messerschmitt-Bölkow-Blohm of West Germany on the AHL) at its complex in Bangalore.

Progress is slow despite the fact that General Electric F-404 engines are to be used initially for the LCA, until HAL's own gas-turbine engine, (coded GTX-35) is ready. The LCA is now expected to make its first

test flight in the mid-1990s. Progress on the AHL is faster. The design work is finished, tooling is continuing and last year the fabrication process began. The 4,000 kg helicopter has a pair of French engines but eventually Indian-designed engines will take their place.

HAL also makes the Dornier Do-228 twin-engined light transport aircraft with West German collaboration. So far, 110 aircraft are on order for the three armed forces as well as for Vayudoot, India's fast-expanding local service feeder airline that operates regional routes.

The Dornier is now finding acceptance among passengers despite some initial hesitation because of minor accidents.

Other HAL operations include local building of the Anglo-French (Sopacat - British Aerospace-Dassault) Jaguar international jet strike-trainer aircraft, currently being manufactured under licence. Its engine now comprises about 40 per cent Indian components.

Also going ahead is the programme to introduce the Advanced Turbo-Prop (ATP) aircraft, developed by British Aerospace by improving the original Avro HS-748.

A Memorandum of Understanding and a business agreement were signed between HAL and British Aerospace last year to increase the scope of work sharing between the two companies on the ATP. As a result, HAL has received an initial order for the supply of 12 tailplane sets for the aircraft to British Aerospace.

Among HAL's recent achievements have been delivery of Jaguar trainer aircraft (Daria version) with a "nav attack system" and Jaguar strike aircraft with Agave radars to the Indian Air Force.

Servicing of AN-32 Soviet transport aircraft, aircraft has been assigned to the company, while a motor glider has been designed and test flown at HAL's plant at Kanpur.

As part of its modest export efforts, HAL has signed a contract with Malaysia for the

export of Chetak helicopter spares worth RS 35m. The Chetak is developed from the French-designed Aerospatiale Alouette III helicopter.

HAL has also negotiated contracts for the repair and overhaul of three Alouette III helicopters and supply of two Chetak helicopters worth RS 50m to Ghana.

Developments in civil aviation relate mainly to the expansion plans of Air-India and Indian Airlines, both of which have fleets far short of requirements since demand for seats on all the routes they fly is growing fast.

Indian Airlines, which has one of the largest domestic networks among the airline members of the International Air Transport Association (Iata), will soon add the Airbus A-320 150-seat airliner to its existing fleet of 11 Airbus A-300s, 27 Boeing-737s, six HS-748s and two Fokkers. It has ordered 19 A-320s, with delivery starting next year, and due for completion by 1990.

After 1991, delivery of 12

more A-320s will start and Airbus Industrie has already been given a letter of intent for these.

Air-India plans to spend RS 15bn to restore its "Maharaja" symbol to its existing fleet two new Boeing 747 "combi" (cargo/passenger) aircraft and two more A-310 Airbus later this year.

Its existing fleet consists of 10 Boeing 747s, three A-300-B4 Airbus and six A-310-300 Airbus. In addition, it has leased an Ilyshin IL-76 from Russia for its Delhi-Moscow route.

Both airlines are under heavy political pressure to buy Soviet aircraft, which have been offered to the Indian government cheaply and on soft credit terms as well as payment in rupees.

For the present, both prefer to buy aircraft from their traditional Western suppliers such as Boeing and Airbus Industrie, but the pressure to buy Soviet products could become overwhelming.

Indian Airlines made an esti-

mated profit before tax of RS 750m in 1987-88. Because of an increasing number of tourist passengers, who are required to buy their tickets in hard currency, it has been able to finance its aircraft purchase plans without government help or borrowings from abroad.

Air-India, on the other hand, has not performed as well financially and, after a number of profitable years, is estimated to have made a loss of about RS 400m in 1987-88 despite the tourist boom that India is experiencing. In 1987 a record 1.2m foreign tourists visited the country.

The international carrier attributes the loss to depreciation and interest charges on loans taken in the past at a time when there was no increase in its carrying capacity.

Another reason is the high cost of aviation fuel bought in India. This costs 107 cents a gallon compared to comparable international rates of 58 to 60 cents.

The airline has had to use

Indian fuel because of the introduction of a number of non-stop flights originating in India.

Since more such flights are planned, the losses are expected to increase, but Air-India is pressing the Government for parity on fuel costs and is optimistic that it will gain relief before the end of the year.

The Government is conscious of the fact that both carriers have a poor image among the travelling public for various reasons.

Both have now had their boards overhauled and their part-time chairmen are distinguished industrialists from the private sector. In addition, the directors now include various representatives of private companies in an effort to improve the airlines' management.

So far, this has not had much effect. A committee appointed to look into the workings of Air-India and Indian Airlines has recently recommended partial privatisation, that would include the sale of equity to the public.

This controversial proposal is still being considered and its acceptance could be delayed because of the current uncertain political situation.

K.K.Sharma

INDONESIA

Collaboration is the keynote

DESPITE A less than spectacular sales record and a considerable debt burden, Nusantara (IPTN), Indonesia's state aerospace industry, continues to attract foreign partners.

The company's drawing board is cluttered with ambitious designs, many of which may never get off the ground.

IPTN was set up in 1976 as the vanguard of Indonesia's industrialisation programme, brainchild of Dr Jusuf Habibie, a trained engineer and former director of the German aircraft manufacturer Messerschmitt-Bölkow-Blohm (MBB).

The company now has established relations with Casa of Spain, MBB, Aerospatiale of France, Fokker, Boeing and most recently General Dynamics on a range of collaborative projects from airframe manufacture to offset and simple maintenance agreements.

Some ventures have been visibly more successful than others. Pride of the fleet is the multi-purpose fixed wing CN-235, jointly manufactured with

Construcciones Aeronauticas (Casa) - Spain's state-controlled airframe maker.

Although there have been few foreign sales to date, this 44-seater, easily converted into a military transport aircraft, is seen as a possible competitor to the Italian ATR-42, as a short-haul commuter plane.

Casa and IPTN are setting up a joint marketing arm in the US, though the Indonesian-made 235 has still to win an airworthiness certificate from the American FAA. In the short term, IPTN will continue to sell to the domestic market, where local carriers and the military are now obliged to buy the company's products.

IPTN's helicopter programme has been more troubled. The company part-manufactures under licence both the Puma and Super Puma of Aerospatiale, the NB-412 with Bell of the US and the BO-105, the MBB twin-engined helicopter.

IPTN was recently awarded an export licence for the 105.

But domestic sales for the rotary wing aircraft have been sluggish, particularly since the downturn in Indonesia's oil industry. Aerospatiale is now converting its Puma for naval use on aircraft carriers.

In the military field Indonesia's defence procurement is now increasingly linked to offset deals with IPTN. General Dynamics of the US has won an order for 12 of its F-16 jet fighters, with about 30 per cent of the \$37m contract cost covered by offset agreements.

British Aerospace and Rolls-Royce are currently discussing possible collaboration on the new Hawk 200, a subsonic combat fighter. Dassault, the French aerospace company, has offered jointly to manufacture the Super Etendard, the fighter used by the Argentine Air Force in the Falklands War.

Offset deals will result in the transfer of skills and also provide the company with badly-needed revenue. The habit is catching on in the civilian air-

craft sales sector also.

IPTN this year signed an agreement with Boeing to supply about \$800,000 worth of parts for its 767 aircraft. Boeing's answer to the Airbus A-320, the Dutch aircraft manufacturer, has also agreed a component supply contract worth between \$15m and \$30m.

Garda, the state airline, today has the biggest fleet of Fokker F-27 and F-28 aircraft in the world. But by granting small offset agreements, both Fokker and Boeing are clearly positioning themselves for the much larger sales contracts as Garuda phases out its domestic DC-8 fleet and enters the market for perhaps as many as 200 new aircraft.

Over the longer term, IPTN has plans to build its own commercial airliner, the 100-seat Atr-90, an unducted prop fan aircraft which was originally scheduled to be in service by 1992.

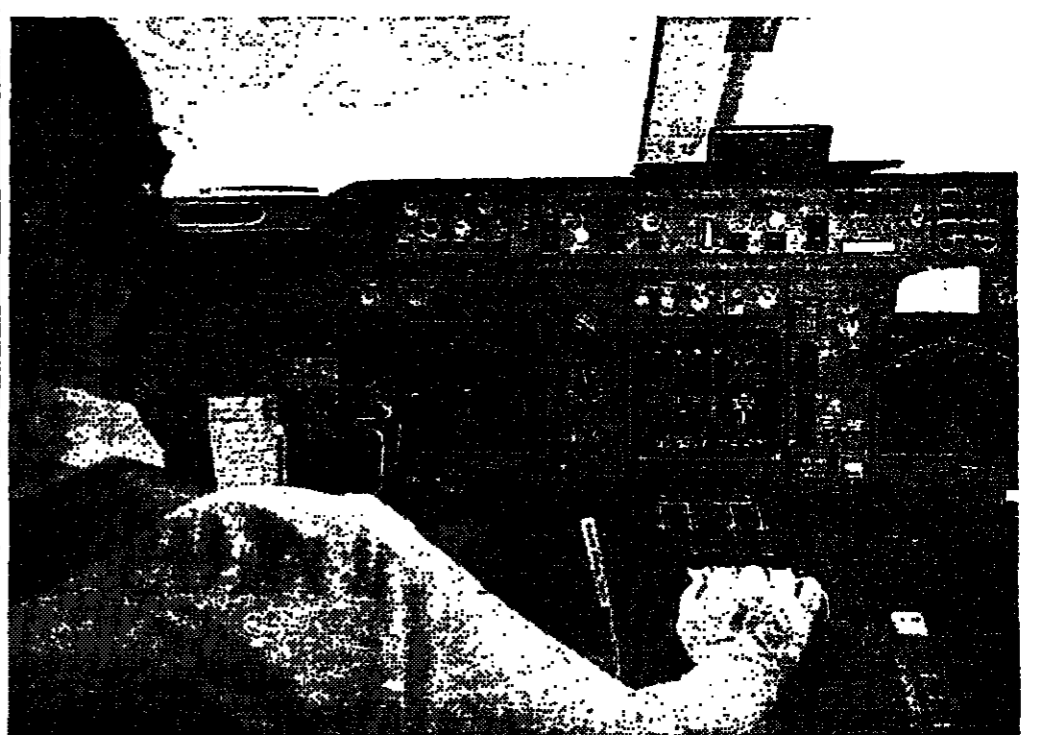
Boeing, MBB and Fokker were involved in developing the concept, but Boeing has

since dropped out. Given Indonesia's lower oil revenues, there is now some doubt whether the project will ever be realised.

Cash constraints may prove the undoing of many of IPTN's more ambitious schemes. Low-interest financing together with countertrade arrangements are likely to be required from any foreign aerospace company wishing to do business with IPTN.

Dassault reportedly offered 100 per cent countertrade in its failed bid to persuade the Indonesians to buy its Mirage 2000 instead of the American F-16.

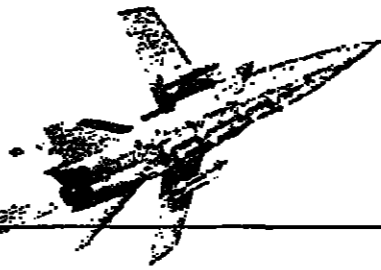
On the engine side, Rolls-Royce already has some measure of collaboration experience, with its Dart engine supplied to Garuda. Before the arrival of the F-16 an earlier generation of British Hawks successfully provided Indonesia with its main frontline fighter.



Flight deck of the new Boeing 747-400 series. The new Jumbo has a completely revamped flightdeck layout using cathode ray displays. The simplified arrangement has 600 fewer dials, gauges and switches than present models and the crew has been reduced from three to two.

John Murray Brown

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AEROSPACE 18

China's aim is to extend co-operation with other countries

Preparing for significant expansion

CHINA HAS now embarked on a major reorganisation of its commercial aviation infrastructure that will also involve a significant expansion of its aerospace industry.

The Seventh Five-year plan covering the period 1986-90 has especially singled out improvements to air transport as a national priority, while also recognising that to develop the aerospace industry is a rapid method of gaining advanced technology and thus facilitating the country's entry into the mainstream of world economic development.

The Ministry of Aviation Industry has outlined the objectives as being to develop new aircraft for trunk routes while also developing new regional airliners, general aviation aircraft and helicopters.

Using its own existing capabilities as a base, the aim is to extend co-operation with other countries and thus progressively modernise the aviation manufacturing and air transport industries.

Forecasts are that the overall volume of air travel in China will rise to between 30m and 35m passengers a year by the year 2000, some three times greater than at present.

For a country of more than 1bn people, this indicates that even by then China will still

have a long way to go before it nears the volume of air travel already achieved elsewhere in the Western world.

One feature of this growth is that China is now encouraging tourism, and it has been estimated that by 1990 it will be welcoming some 5m tourists annually, a figure that may well rise to 10m a year by the turn of the century, generating US\$9-10bn annually in revenues.

China is building hotels - close to 1,000 international-standard hotels are now available throughout the country, with a total capacity of 147,500 rooms, and about 100 more under construction, or another 30,000 rooms.

China is also building airports, with at least five to be built at Yangyang in Shanxi Province, Xining in Qinghai Province, Ningbo and Wenzhou in Zhejiang Province and Taoyuan in Liaoning Province, with others planned for the 1990s.

Such growth is already expected to result in a doubling of the requirement for aircraft, from the present 400, mostly small and ageing types built under licence to Soviet designs, to about 800, including many Western-built aircraft.

Already, a major restructuring of Chinese civil aviation is in progress. The Civil Aviation

Administration of China, for long the sole entity governing air transport, and responsible also for airports and air traffic control besides being also the country's flag carrier, is being reorganised into six operators.

CAAC Beijing becomes China International Airways, taking over long-haul services, while CAAC Shanghai becomes China Eastern Airlines. The CAAC Guangzhou Regional Administration becomes China Southern Airlines, the Xian Administration becomes China Northwest, the Chengde Administration becomes China Southwest and the Shenyang Administration becomes China Northern.

The current aircraft fleet is being divided between the airlines, but purchasing of aircraft will remain in the hands of the State-run China Aviation Supplies Corporation.

At the same time, although these airlines will have a degree of autonomy, top management is being nominated by the CAAC, while fare-fixing and route selection will still also be in the hands of the State. But there will be a few "independent" airlines, operating on a small scale (fewer than 200,000 passengers annually).

It is evident that China is still trying to establish precisely

which new types of airliner are best suited to its long-term needs. This explains why over recent years it has been buying in small numbers a wide variety of foreign-built jet airliners, spending more than \$1.5bn on Boeing 747s, 767s and 757s, Airbus A-310s, McDonnell Douglas MD-82s, British Aerospace 146s, Soviet Tupolev Tu-154s and Short 360s.

Each type is being carefully studied in operational service, and from this experience the Chinese airlines will determine precisely what they need and order when they are ready.

In developing its own internal commercial aviation infrastructure, China will seek not only to meet its immediately emerging needs, but also to build up its own aerospace skills, initially through the manufacture of Western airliners under licence, and the manufacture of parts for Western aerospace companies, leading to joint development of major new airliner ventures.

Already, for example, parts of the BAe 146 and Short 360 are already being made under sub-contract in China, as are parts for the Boeing 747 and 737, and the Franco-Italian Avions de Transport Regional ATR-42. Both Boeing and McDonnell Douglas are train-

ing Chinese aviation engineers in Seattle and Long Beach, California.

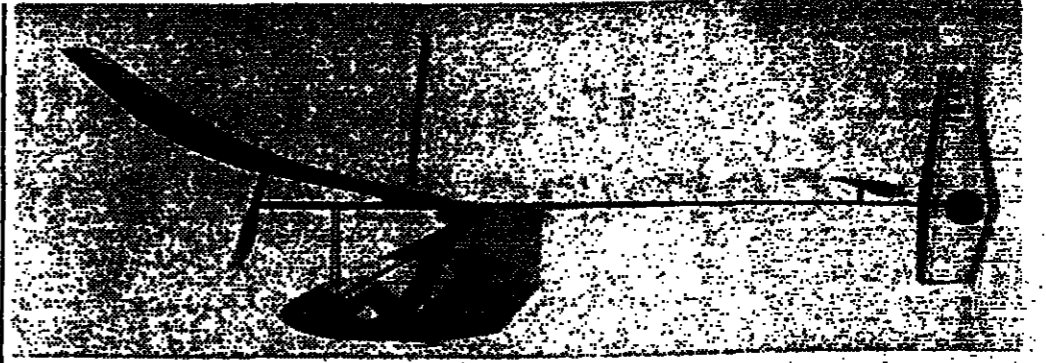
The McDonnell Douglas MD-82 twin-engined short-to-medium range jet airliner, for use in China, is already being assembled in a specially-built factory in Shanghai by the Shanghai Aviation Industrial Corporation (which built the Y-10, the first Chinese jet airliner).

At the same time, China is looking to export to the West some of its own indigenous aircraft, such as the 17-passenger Harbin Y-12 light short take-off and landing transport.

This collaboration is essential, and Western manufacturers who ignore it are likely to find no long-term outlets for their own products in China.

Currently, China wishes to build a major new 150-plus seater "trunk route airliner" in collaboration with Western countries. The three major builders, Airbus, Boeing and McDonnell Douglas, have all submitted proposals, as have the "Big Three" engine builders, General Electric, Pratt & Whitney and Rolls-Royce.

The Airbus proposal is based on the A-320, the Boeing plan on the 737 and 757 which are already in service in China, while McDonnell Douglas is concentrating on its MD-82



A SECOND TRY BY DAEDALUS

prop-fan project. The time-scale for such a venture is not clear, but it would be unlikely to enter service much before the mid-1990s, even if a formal go-ahead were given next year.

But preliminary indications are that the project is regarded as serious at the top level in Beijing, with eventually upwards of 150 aircraft needed. At the same time, China is becoming increasingly interested in developing regional aircraft, of 100 seats and below, to meet its massive demands for smaller aircraft to serve its scattered population centres.

One project is for Messerschmitt-Bölkow-Blohm of West Germany and the China National Aero-Technology Import and Export Corporation (CAEC) to develop, through a joint company, a 75-seat twin-engine commercial transport, the MPC-75, which could well be a prop-fan type venture.

Michael Dome

PROBABLY the most unusual aircraft at the Farnborough Air Show will be Daedalus (above), which flew 74 miles between the islands of Crete and Santorini in April, a record for human-powered flight.

The graphite-epoxy composite craft, weighing only 70lbs, was pedalled by the Greek cycling champion Canellos Canelopoulos, who had a watery ending to his 3hr 55 minute journey. Wind snapped the tail as he was trying to land on a beach and the Daedalus craft fell into the sea.

The 112ft wing-span aircraft was built by students and engineers at Massachusetts

Institute of Technology to recreate the flight of the Greek mythological figures Daedalus and his son Icarus after their escape from Crete.

The latter, despite his father's warnings, flew so close to the sun that the wax on his wings melted, plunging him into the sea.

The modern-day project was sponsored by United Technologies and the foods company Shakes.

The previous distance record for human-powered aircraft was set in 1979, when Bryan Allen piloted Paul MacCready's Gossamer Albatross 22 miles across the English Channel.

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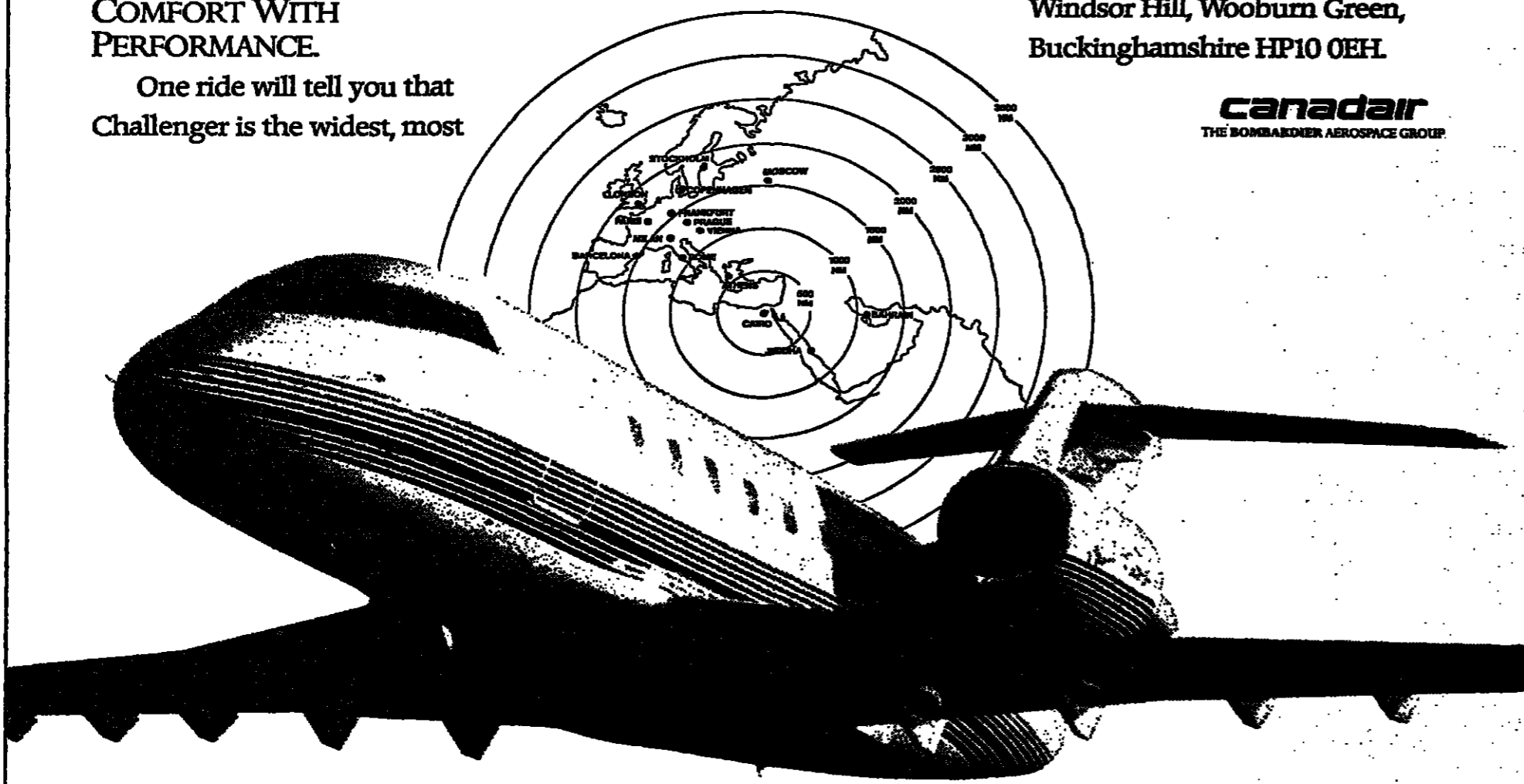
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JAPAN

Designated a key industry

JAPAN'S aerospace industry is relatively small, but its leaders have big ambitions. And it has been designated by MITI, the Ministry of International Trade and Industry, as a key industry of the future.

This would seem to be enough to conclude that the industry is likely to become a formidable world competitor.

However, Japan's aerospace industry has two significant handicaps. First, most of its output is for military use, but Japan's military budget is limited and the country has forewarned arms exports.

Second, since the reevaluation of the yen, the costs of development and production of civil aircraft in Japan have become so high that the country's aerospace companies would have difficulty in justifying undertaking any projects on their own.

Japan's space effort is less troubled. It is financed almost entirely by the Government, is aimed at scientific and telecommunications developments, and will soon be technologically self-sufficient.

More than 80 per cent of the Y633.2m output (1987 figures) of Japan's aircraft industry goes to one customer, the country's Self Defence Force. It is spending Y542.5bn (£2.4bn) this year on aircraft and missiles, most of it with Japanese contractors.

Most of the work is split among the three top aerospace contractors, Mitsubishi Heavy Industries (MHI), Kawasaki Heavy Industries (KHI) and Fuji Heavy Industries (FHI).

MHI is by far the largest of the three, and has had the biggest single contract, the supply of F-15 fighters for the Air Defence Force. KHI builds helicopters, T-4 trainers and the P-3C anti-submarine patrol aircraft, while Fuji supplies helicopters and training aircraft.

MHI also dominates on the missile side, with Toshiba and Mitsubishi Electric also making certain models.

The F-15 programme is coming to an end, and is to be replaced by a new fighter, called the FSX, a joint US\$1.6bn development with the US of the F-16 made by General Dynamics.

Agreement on the FSX project was reached last September after much controversy. The Japanese side wanted to develop its own next-generation aircraft, partly to prove and improve its own capability, but the US insisted on joint development, not least for trade reasons.

On the civil side, Japanese aircraft makers have been trying for years to catch up with Western competitors, but have been restricted so far to a strategy of cooperation with foreign partners. Thus, MHI, KHI and Fuji all make components for the Boeing 787 jetliner and are planning to be involved in the Boeing 737 project to develop a 150-seat jetliner.

MHI and KHI considered an approach from Airbus Industrie last year to become component makers for the A-380 and A-400 models, but after considering it they withdrew, apparently because of their close links with Boeing. MHI, KHI and Ishikawajima-Harima Heavy Industries (IHI) participate in the International Aero Engines consortium that makes the V-2500 jet engine.

The industry's main hope for

an independent development at this point is for a short take-off and landing (STOL) aircraft - strongly favoured by Japan where distances between population centres are relatively short but the terrain is mountainous and it is difficult to build long runways.

Indeed, the country's only independent development to date has been in this sector, the turboprop VS-11, developed in the early 1960s and still widely used internally. In 1977, a new STOL development project, the Asuka, was begun. It will be completed this year, and the industry is urging the Government to go on to authorize production of a 75-seat STOL plane, now referred to as the VS-X.

Unfortunately, their proposal runs into several practical problems. For one thing, there are already a number of modern STOL aircraft available in the world, including the British Aerospace BAe 146, which would fill Japanese needs satisfactorily. Any move by Japan to develop a competitor at this stage would rouse considerable resentment among other makers, who have been trying hard to sell in Japan.

Japan's space effort will soon be self-sufficient

Second, the potential market in Japan is only about 150 aircraft, less than a quarter of what industry analysts say would be necessary to make the project break even given Japan's high costs of production.

However, a mishap with a VS-11 underlined its age and industry leaders are now trying to attract foreign partners for the project, especially in nearby Asian countries.

On the space side, Japan's capabilities came to wider public attention last year when two Japanese spacecraft, Sakigake and Suisei, approached and observed Halley's Comet.

Scientific exploration is still a major element in the country's space programme and the Institute of Space and Astronautical Science (Isas) is eager to carry out more studies of comets.

The other main element is communication and weather satellite and rocket development. The National Space Development Agency (Nasda) already has considerable experience in launching satellites and is on schedule to launch its first totally internally-developed rocket, the H-2, in 1992.

The rocket will be able to carry a two-tonne payload and so lift Japan into the exclusive club of countries capable of launching their own - and others' - geostationary communications satellites.

Nasda also has just concluded an agreement to provide a space-processing module for the US manned space station project in 1996, and has ideas on the drawing board for space aircraft and space factories.

However, all require considerable funding and the country's space budget is still relatively small. At ¥121.9bn in 1987, it was less than a tenth of the US effort.

Ian Rodger

AEROSPACE 19

Australia is to remove detailed restrictions

Government limitations coming to an end

AUSTRALIANS who fly lead peculiar lives. The airline which flies them out of the country cannot fly them within it.

That is not all. Domestic air fares are high; schedules are highly vulnerable to industrial action; and in-flight service is so institutionalised you are given a meal on the briefest flights.

But times are changing. Thanks to a decision announced in October last year, 35 years of detailed government regulation of Australian aviation are coming to an end.

In particular, the current "two airline" policy is being replaced from 1990. This policy has limited entry to the aviation industry through controls on the importing of aircraft. It has also restricted competition in services and fares on major routes.

Giving details of the changes, Senator Gareth Evans, Minister for Transport and Communications, said con-

trols over aircraft imports, which had provided the "threshold underpinning" to the arrangements currently regulating the industry, would be removed.

Similarly, the two domestic carriers - Ansett, owned by Sir Peter Abeles' TNT group, and Mr Rupert Murdoch's

Constraints on new operators will also go

News Corporation, and the state-owned Australian Airlines - will no longer be subject to detailed controls on passenger capacity or air fares. The existing constraints on the entry of new domestic operators will also go.

Changes on the international side are less sweeping. Qantas, the state-owned international airline, is to remain Australia's sole designated international carrier. And neither Qantas nor any other international airline will be allowed to carry domestic passengers or freight on regular services.

On the other hand, Qantas

has been allowed to resume carrying passengers of other international airlines on domestic sectors of its international services. Until this restoration of its "interlining" rights, it had some 18,000 empty seats a week on these routes.

The implications of all these changes for the airlines and the Government have not taken long to sink in. In the case of Australian Airlines, Senator Evans said an essential element of the deregulated environment would be a "strong, viable, efficient Australian Airlines, able to provide effective competition across the trunk route network."

The airline has since been converted into a state-owned company and the Government has relaxed its detailed control, giving the airline more flexibility to operate on commercial criteria.

More controversially, the Government would like to see the airline's weak capital base strengthened through full or partial privatisation rather than through an injection from the state's own limited coffers.

The airline needs some A\$250m in fresh capital over the next three years. Along with other privatisation proposals, however, this has run into strong resistance from Labor party activists.

Australian Airlines nevertheless has gone ahead with its plans to compete against the powerful Ansett. In July it announced an order for nine Boeing 737-400 aircraft plus another five options, to be delivered in the period 1990-92.

The move followed a decision to defer an order for nine Airbus A-320s. Australian felt it should not incur the higher costs of introducing a completely new type of aircraft when there were so many uncertainties over deregulation, the airline's capital funding and its ownership. The Airbus order will now be reviewed by mid-1992.

Ansett will undoubtedly be up against a formidable competitor in Ansett. Within weeks of confirmation last year that the Labor government would terminate the two-airline policy, Ansett bought East-West Airlines, a small carrier which had tried unsuccessfully to become a low-fare third force taking on the two giants.

Then last October Ansett announced plans to buy 16 Boeing 737-300s, five 737-500s and six 737-200s, with options on an unspecified number of additional aircraft. Some of the aircraft are earmarked for Ansett's New Zealand and international leasing operations, but they are also intended to secure domination of Australia's deregulated skies.

For Qantas, as with Australian Airlines, the future remains clouded with uncer-



The 150-plus seater European Airbus A-320 airliner has entered regular service this summer. Here, the Airbus Industrie test aircraft is followed in formation by aircraft in the fleets of the first three users - Air France, Air Inter and British Airways

tainty because of questions over its ownership and capital needs. Last April a proposal surfaced to merge Qantas and Australian with their state-owned counterpart in New Zealand, but the plan was dropped after talks between the two governments.

Qantas is now bidding for a stake in Air New Zealand, which the Wellington government wants to privatise. British Airways is also interested, and if it succeeds that might hurt Qantas's competitiveness.

Success for Qantas, on the other hand, would emphasise the capital problem. Like Australian, it needs a fresh equity injection. The airline wants A\$600m, about one-tenth of the amount it expects to spend

under its latest five-year plan. Qantas could of course borrow on the capital markets to meet its needs, but it would be unhappy about swelling its debt-equity ratio beyond its current high level of 80 per cent: 20 per cent.

Most of the airline's projected spending is to go on new aircraft. It recently added two more Boeing 747-400s to the four-aircraft order announced last year, and one more 767-300 to make five due for delivery. The airline is already operating some 767s.

As for the Australian privatisation debate itself, this is in limbo. The Labor Party, at its biennial conference in June, put off a decision by forming a review committee. The Liberal

Party opposition is committed to privatisation, and Qantas and Australian Airlines are at the top of the agenda. But no election is scheduled before 1990.

Meanwhile, the Government has other aviation issues to grapple with. For example, it is involved in numerous unresolved wrangles with foreign governments over international air rights, the most awkward of them with the US.

However, this one has now been resolved. Last month, Australia and the US reached agreement after two and a half years of negotiations, in a deal which gives each country extra access to each other's cities.

In other significant moves to reform the aviation industry,

the Government in January established a new state-owned Federal Airports Corporation to assume responsibility for the country's major civil airports and terminals. One result is the start of long-awaited improvements at the country's most important and least impressive international gateway - Sydney's Kingsford Smith Airport.

The Government has also set up a new Civil Aviation Authority to provide airways services on a commercial basis. This will levy charges for its services instead of depending on budget revenues from excise and customs duties on aviation turbine fuel and departure taxes.

Chris Sherwell

SOUTH AFRICA

Looking for exports

SOUTH AFRICA'S aerospace industry has faced a daunting challenge over the last decade - to update existing aircraft and develop relevant technological niches in the face of the UN arms embargo and the build-up of increasingly sophisticated Soviet equipment in Cuban and Angolan hands.

The industry's top priority has been to upgrade the South African Air Force's ageing fleet of Mirage F-1 and even older Mirage 3 fighters to counter Soviet-built MIG-23s, and do the same for its air-to-air missiles and radar defences.

At the same time the industry has had to acquire the technological skills to produce key components, like composite blades for helicopter rotors and jet engine turbines - and the capacity to re-build and repair damaged aircraft.

Since the arms embargo was imposed in 1977 Armscor, the State-controlled Arms and Munitions Corporation, and a privately owned complex of private contractors, has transformed South Africa from a heavy importer to a major exporter of military equipment.

The bulk of exports so far has consisted mainly of battle-tested armoured vehicles and small arms and the long range G-5 and mobile G-6 artillery, all designed for gruelling third world bush and off-road conditions.

In future however the aerospace side of the defence industry also sees considerable potential, particularly in the needs of financially hard-pressed third world air forces opting for modernisation of existing fleets as an alternative to buying expensive new generation aircraft.

Thanks to the arms embargo and the pressing need to make the maximum use of skills and know-how, Armscor's Atlas Aircraft Corporation, with its sprawling factories close to Johannesburg's Jan Smuts Airport, is believed to be the only

aerospace company in the world which builds fixed-wing aircraft, helicopters, engines, spare parts and carries out maintenance under the same roof.

Its main project at present is the conversion of the delta-winged Mirage 3 fighters, the first of which were delivered in the early 1960s, into modern aircraft capable of matching the MIG-23. The South African Air Force has given the name Cheetah to the improved aircraft.

The industry has opted for developing existing skills and techniques

This has meant major modifications to the engine and airframe, new avionics and missiles. The end result bears a close resemblance to the Israeli Mirage 3 fighter, but industry sources deny resemblance. The South African Air Force has virtually taken over the Lavit fighter project abandoned by Israel as too expensive.

"If the Israelis could not develop a new fighter with \$30m worth of US military aid and access to US technology, we would be crazy to try our own," one source declared.

Instead the South African industry has opted for the "building block approach," developing existing skills, refining existing techniques and taking upgrading to the limit.

Military intelligence sources in the Namibian "operational zone" insist that they have not lost air superiority to Cuban piloted MIG-23s. This was the impression left by the bombing of a dam at Calaque in Southern Angola by 12 Cuban MIG-23s in June when 11 South African soldiers were killed and no South African aircraft were scrambled.

Apart from greater power,

and speed from the upgraded engine and greatly improved avionics, the latest Cheetahs are also equipped with the recently introduced South African-designed and built V8 Dartler missiles.

The V8 missiles are infra-red homing dog-fight missiles developed by Kentron, Armscor's missiles and avionics subsidiary.

What makes them special is that they are fired by pilots using South African-designed and built helmet-sights. Not being able to make or buy new aircraft, the industry has produced a pilot and machine combination which it believes can match the MIGs.

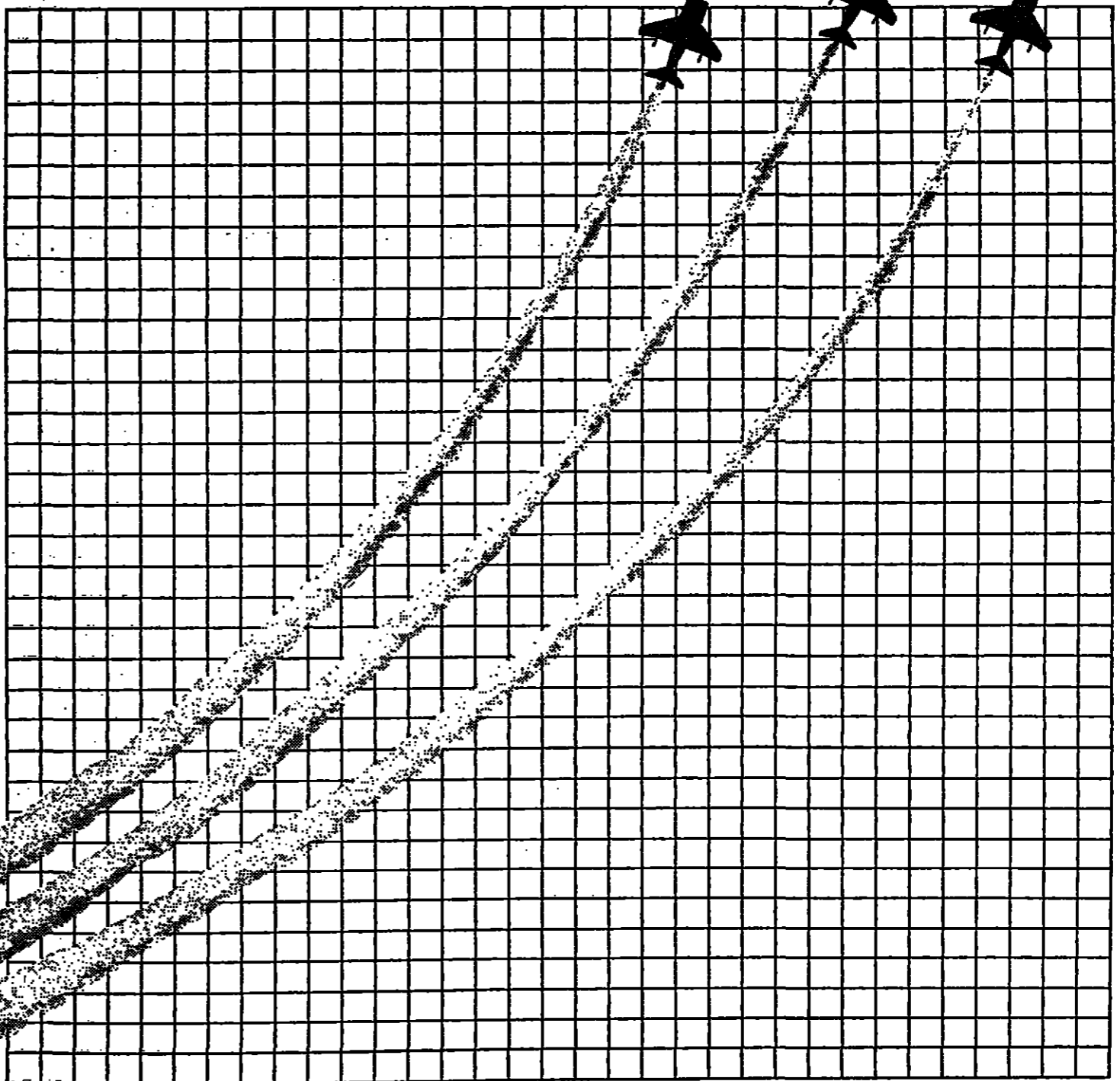
"You don't have to turn like a MIG if you have an all-aspect capability missile like the Dartler and a pilot with helmet sights. The pilot can swing his head instead," industry observers say.

Unlike much of South Africa's other battle-tried equipment, however, the comparative virtue of the new Cheetah has yet to be proved in actual combat, as thus far there is little evidence of direct confrontation between MIGs and Cheetahs in the Angolan skies.

Apart from the Cheetah programme, which when completed is expected to be followed by similar upgrading of the more modern Mirage F-1 fighters, the industry has also substantially upgraded its helicopters, making its own gear boxes, rotors and other equipment.

The French-supplied Alouette has been developed into the totally South African-made Atlas Alpha XH-1 helicopter gunship, while the larger Puma is about to be similarly transformed into the Atlas Beta XTP-1. The first experimental Puma has been turned into a test bed for new weapons systems.

Anthony Robinson



Growth curve.

The growing world strength of Plessey in aerospace is the result of a three-pronged strategy.

Growth through pursuing significant contracts in Europe and the USA, such as those it has won recently in electronic warfare, fuel pumping systems and the Strategic Defence Initiative and is bidding for in the European Fighter Aircraft.

Growth internationally through acquisitions, like that of Leigh Instruments and the Electronic Systems Division of Singer.

And through expanding its stake in the Italian electronic warfare specialist, Elettronica. With such moves, Plessey is widening its technological base and strengthening its presence in North America and Europe.

Growth through research and development, enabling it to provide integrated avionics packages and work towards the ultimate fusion of aerospace electronics and engineering.

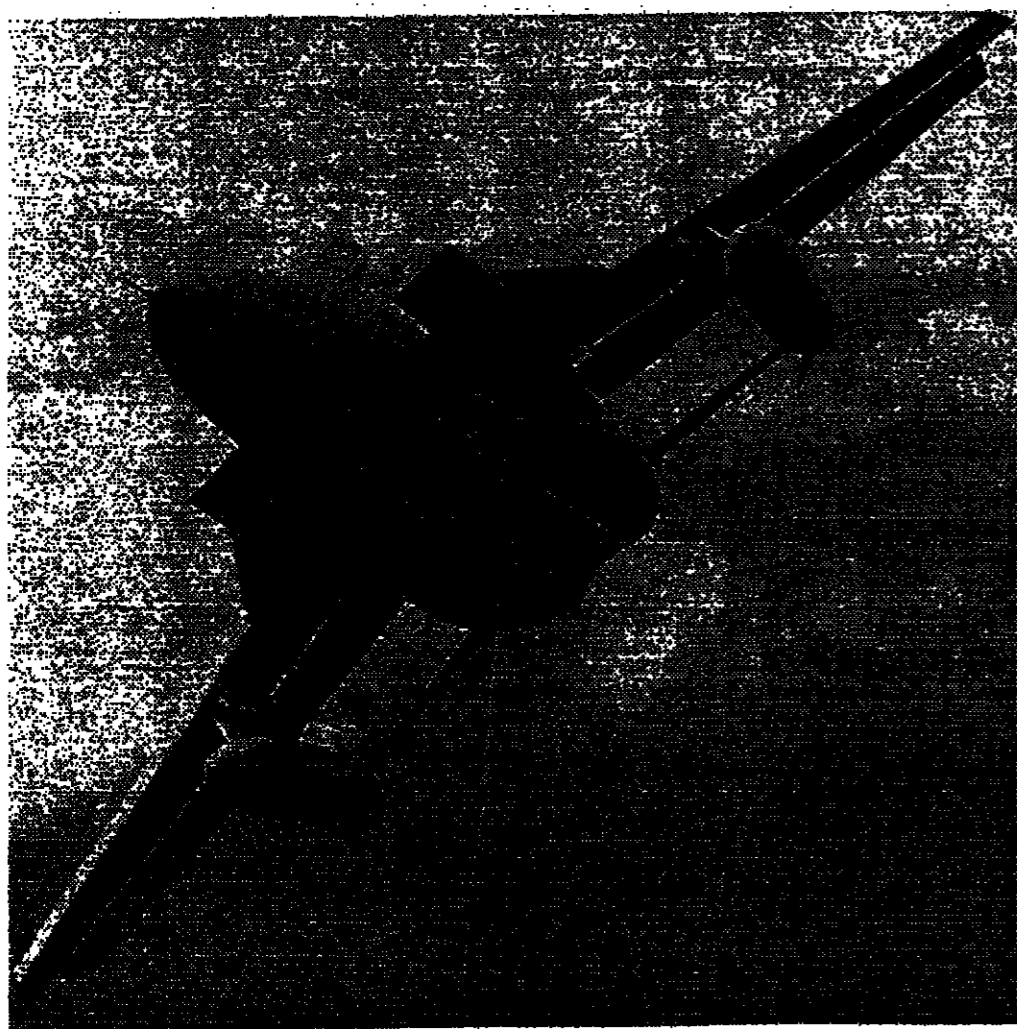
Plessey is meeting the needs of military and civil aircraft worldwide. Its solutions cover identification, navi-

gation, communications, flight data, electronic warfare, armament control, fuel pumping, actuation, electrical generation, power control and aircraft components and assemblies.

Plessey in aerospace is firmly on the growth path to success.



The height of high technology



Although the new European Fighter Aircraft (EFA) is now going ahead, the European multi-role Tornado combat aircraft will remain in quantity production for many years to come.

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AEROSPACE 20

The armed forces are still the biggest individual buyers and activity remains high among the main manufacturers

US keeps share of depressed helicopter market

THE OVERALL world market for helicopters has been depressed for some time. Military budgets have been reduced and although there are some small bright patches, such as demand for the smaller, lighter and cheaper helicopters for business users in the UK, overall commercial procurement remains low.

This is especially so in the offshore oil and gas industries, where the peak exploration period generated by the oil crises of the 1970s, which created a boom for helicopters, has now given way to logistical support requiring fewer aircraft.

The post-war pattern of helicopter deliveries shows that, from virtually none in 1945, deliveries (both civil and military) rose to a peak of close to 4,000 annually in the late 1960s/early-70s period, falling back subsequently to only a few hundred in 1983.

In that situation, the US share of the world market has remained high, ranging from a peak of close to 100 per cent at the end of the 1939-45 World War, falling to about 75 per cent at the end of the 1960s as other manufacturers staked their claims for a share of the markets, and then sliding steadily as the world market fell away to about 50 per cent today.

The armed forces worldwide remain the biggest individual buyers of helicopters of all kinds, and of those in turn the US armed forces remain the biggest individual purchasers in the non-communist world.

But even in the US, constraints on military budgets have led to cuts in both procurement orders and development funds for new ventures. The lack of civil interest, especially outside the US, stems from such factors as the comparatively high initial purchase costs of rotary-winged aircraft, and their high maintenance costs, coupled with the continued hostility to such aircraft by many residential communities and environmental groups because of their noise.

Apart from companies offering air-taxi services, and some individual business users, the civil helicopter operators are mainly government or other statutory authority users, such as police, coast-guard, and search-and-rescue organisations, or other authorities, and

World Market for Helicopters 1989-1998

	Light		Inter-medium		Heavy	Total
	(a)	(b)	(a)	(b)		
US Military			180	1,820	270	2,070
Non-US Military	980	1,210	\$1.3	\$12.1	\$5.7	\$19.1
World Civil	\$0.6	\$1.9	1,610	2,050	115	5,965
	1,460	1,410	\$7.5	\$16.2	\$1.6	\$27.8
	\$0.9	\$2.1	1,160	225	—	4,255
	\$4.1	\$1.5	\$4.1	\$1.5	—	\$6.6
Total	2,440	2,620	2,950	3,895	385	12,290
	\$1.5	\$4.0	\$12.9	\$29.8	\$7.3	\$55.5

(a) light single-engine (b) twin-engine. Source: Sikorsky Aircraft (US)

industrial organisations. Companies in offshore oil and gas exploration and development are still significant buyers despite their reduced requirements.

Nevertheless, activity remains high among the main helicopter manufacturers: Aerospatiale of France, Agusta of Italy, Messerschmitt-Bölkow-Blohm (MBB) of West Germany and Westland of the UK, together with the US companies, Boeing Helicopters, Bell Helicopter Textron, McDonnell Douglas Helicopters and Sikorsky in the US, supported by a few smaller US manufacturers such as Enstrom, Hiller, Robinson and Schweizer.

Forecasts by Sikorsky Aircraft, the world's biggest helicopter manufacturer, indicate that over the next decade to 1998, Western world helicopter sales will amount to 12,290 aircraft worth \$55.5bn (in 1988 dollars), rather lower than a year ago and reflecting a less optimistic projection of US military needs.

The US military nevertheless will remain the most significant customer, taking some 2,070 aircraft, representing 17 per cent of the projected market in unit sales, worth \$19.1bn or 36 per cent of the dollar value. Other military sales worldwide will account for some 5,965 machines, worth about \$27.8bn.

The civil market is expected to show little growth, accounting for some 4,255 aircraft worth about \$8.6bn, with both the offshore oil and corporate transport markets remaining depressed.

The major programmes in Western Europe at present are all primarily military. They

include the Anglo-Italian EH-101 multi-role aircraft to replace the Sea King for anti-submarine warfare, among other duties, with a civil version also planned; the Franco-West German common anti-tank helicopter programme; the NH-90 NATO helicopter for the 1990s; and a light attack helicopter, the Tonal, based on the Italian Agusta A-129.

All four are international ventures, reflecting the need to spread the heavy development costs and maximise markets.

The EH-101 is a joint venture between Westland and Agusta, with initial planned orders for more than 150 aircraft for the Royal Navy, Italian Navy, the RAF and the Canadian Navy. Eventual requirements for the EH-101 are expected to exceed 800 aircraft.

The anti-tank helicopter programme is being undertaken by Eurocopter, a joint company set up by Aerospatiale of France and Messerschmitt-Bölkow-Blohm of West Germany.

The aim is to produce up to about 400 aircraft for the two countries, with three versions envisaged — escort and fire support, and separate anti-tank versions for both the French and West German armies.

The NH-90 programme is a four-nation venture between France, West Germany, Italy and the Netherlands. Two versions are envisaged — NH-90, a shipborne (primarily frigates) helicopter for anti-submarine warfare, surface attack and search and rescue duties, and TTH-90 for land-based tactical transport.

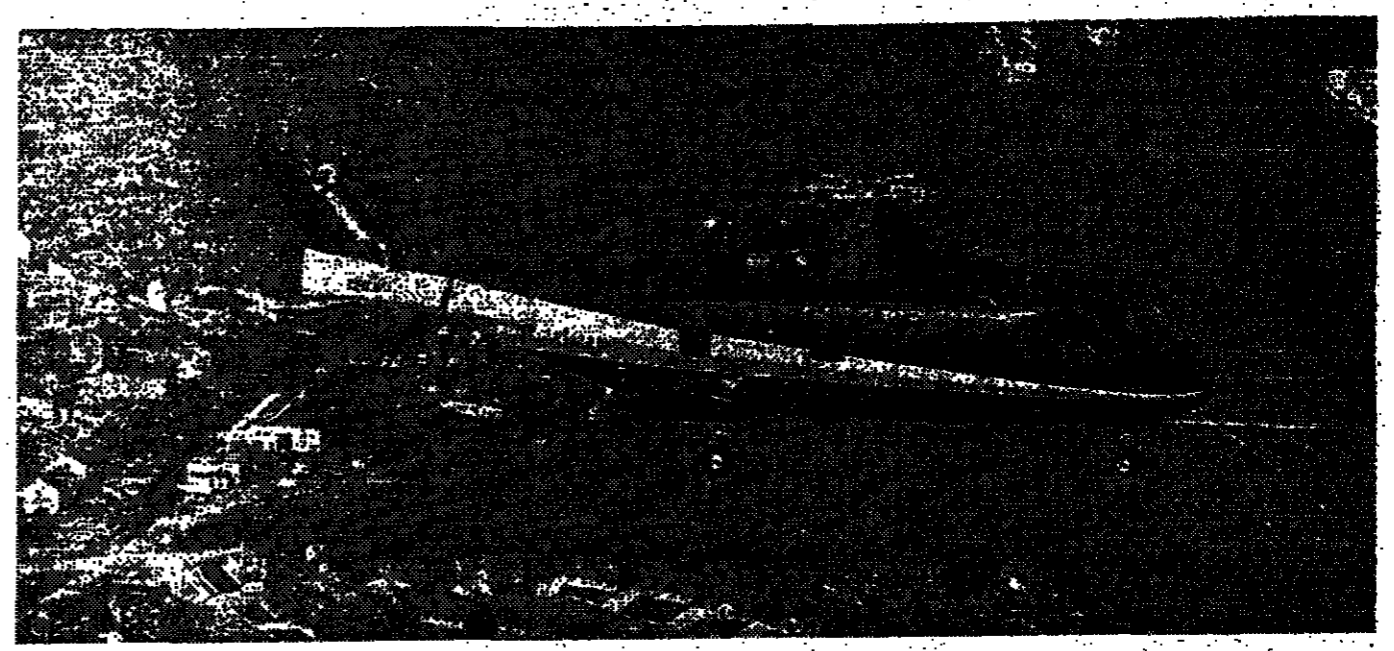
Although the UK originally participated in the NH-90, it withdrew in April 1987 on the basis that the EH-101 would

meet its requirements. Currently, the first flight of the NH-90 is set for late 1991, with first deliveries in 1995.

The Tonal light attack helicopter is a four-nation venture between the UK, Italy, the Netherlands and Spain. The four armies are studying submissions from the Joint European Helicopter team involved, and a common design may be agreed by this September.

In the US, the original Army LEHX programme for a single type of lightweight armed reconnaissance helicopter to replace a variety of types in current service, although now considerably scaled down, remains a massive programme. It involves the eventual procurement of well over 2,000 aircraft, worth some \$37bn.

Two major US industrial teams — Bell Helicopter Textron/McDonnell Douglas and Sikorsky/Boeing — are developing competitive designs in response to a "request for proposals" from the US Army.



Top: The Westland version of the US Sikorsky Black Hawk which the UK company is now offering to UK and other customers. Above: The Anglo-Italian (Westland-Agusta) EH-101 multi-role helicopter, now in production, with both military and civil versions planned. Governments and other statutory authorities are major users of helicopters while companies in offshore oil and gas exploration and development are still significant buyers despite their reduced requirements. The US military will remain the most significant single customer in the West even though cuts in military budgets have led to fewer orders.

Michael Donne

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